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THESIS

EFFECTIVENESS OF THE UNITED STATES MARINE CORPS TIERED EVALUATION SYSTEM

by

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March 2015

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**EFFECTIVENESS OF THE UNITED STATES MARINE CORPS TIERED
EVALUATION SYSTEM**

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

This thesis analyzes how effective the Marine Corps Tiered Evaluation System is at measuring future success, more specifically, in the form of promotions, career longevity, physical fitness level and performance evaluation averages.

The analysis observes first term re-enlistees from each quality tier through their future service to observe promotions, career longevity, physical fitness level and performance evaluation averages. The analysis utilizes ordinary least squares regression and linear probability models to analyze success measure outcomes. The outcomes are compared across various tier levels to determine if the tiered evaluation system is a valid tool at predicting future success.

The findings indicate the Marine Corps Tiered Evaluation System is valid at distinguishing individual quality but can be improved in many ways to better distinguish quality and aid the decision makers in the reenlistment process. These improvements include a system encompassing more tiers and re-weighting the quality score components.

The USMC Tiered Evaluation System is the foundation for identifying quality Marines for retention. Improving this system will better aid stakeholders in the reenlistment process and improve overall quality and organizational effectiveness.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFADBD	armed forces active duty base date
AFQT	Armed Forces Qualification Test
ASVAB	Armed Services Vocational Aptitude Battery
CFT	combat fitness test
DOD	Department of Defense
EAS	end of active service
ECC	end of current contract
ECFC	enlisted career force controls
FTAP	first term alignment program
HQMC	Headquarters U.S. Marine Corps
M&RA	Manpower and Reserve Affairs
MCMAP	Marine Corps Martial Arts Program
MMPR	Marine Corps Promotions Branch
MOS	military occupational specialty
MRO	Marine reported on
NJP	non-judicial punishment
PEF	program enlisted for
PFT	physical fitness test
PMOS	primary military occupational specialty
RELM	reenlistment lateral move request
ROCV	reviewing officer cumulative value
RSRV	reporting senior relative value
SQT	Skill Qualification Test
STAP	subsequent term alignment program
TFDW	Total Force Data Warehouse
USMC	United States Marine Corps

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I. INTRODUCTION

A. BACKGROUND

The retention of high-quality personnel is a key component to sustaining success in any large organization. Retention of high-quality personnel cannot occur without first defining what makes a high-quality person. Within the Department of Defense, a great amount of research has focused on developing retention incentives, whereas little research effort has focused on defining what makes a quality person. However, the value of an individual to the organization increases as the individual rises in position; therefore, quality retention practices can have a greater organizational impact than that of enlistment quality (Rosen, 1982).

General James Amos, the 35th Commandant of the Marine Corps from 2010 to 2014, listed in his planning guidance, “the goal of retention is to retain the most qualified” (Amos, 2010, p. 14). In 2011, in response to the Commandant’s Planning Guidance, the Marine Corps amended the reenlistment process to add a tiered evaluation component to complement first-term reenlistments (United States Marine Corps, 2011). The amended process uses a set of seven quantifiable metrics to compute a quality score for an individual Marine. The score is then compared to the quality scores of his peers within his military occupational specialty (MOS) and year group. Lastly, the Marine is placed in one of four quality tiers ranging from eminently qualified to below average. According to the administrative message outlining the new reenlistment process, the process was updated “to assist leaders in identifying Marines that have excelled in relation to their peers” (United States Marine Corps, 2011, p. 14).

B. OBJECTIVE

The primary objective of this study is to evaluate and determine whether the tiered evaluation process is an effective predictor of future success in the Marine Corps. For the purpose of this research, future success is defined in terms of promotion speed, career longevity, physical fitness and performance evaluations. Since many of the same quantifiable metrics, such as fitness tests scores and rifle scores, are used in both the

tiered evaluation process and how Marines are evaluated for promotion, I believe Marines identified as higher quality in comparison to lower quality Marines get promoted more quickly. Likewise, for the same reason I believe higher quality Marines also have above average evaluations. As the attractiveness of civilian jobs varies with economic fluctuations, the appetite for military service also has shown to fluctuate (Kapp, 2013). As a result, I believe a large number of high-quality Marines exit military service in pursuit of vast opportunities existing in the civilian workforce. By reason of high quality exits, the career longevity of higher quality Marines may not be significant when compared to those Marines identified in lower quality tiers.

C. RESEARCH QUESTIONS

Observing individual Marines from various quality tiers provides information to assess the tiered evaluation system. The primary research questions seek to determine how well the tiered evaluation system predicts future success in promotion speed, career longevity, physical fitness, and performance evaluations, and suggests if a revised system can be a better predictor of success. While exploring these questions, secondary questions to be answered include: Are the quality score components weighted correctly and how do they differ in statistical significance and coefficient variation across occupational field groupings?

D. SCOPE AND LIMITATIONS

1. Scope

The study focuses on first-term Marine reenlistments from fiscal year 2000 through 2012, using data retrieved from the Total Force Data Warehouse (TFDW). The analysis observes first-term re-enlistees from each quality tier through their ensuing term of obligated service to observe promotions, evaluations and career longevity information. From 2003 to 2013, it is assumed that retention behavior was influenced by the wars being fought in both Iraq and Afghanistan. The scope of the study was expanded to include Marine enlistee data dating back to 1995 to address any potential effect the wars may have had on quality personnel being retained.

2. Limitations

The tiered evaluation system was used for the first time in fiscal year 2012; therefore, this research estimates placement in the quality tiers using the same scoring metrics used in the current tiered evaluation system. All metrics used in computing the individual's score exist over the scope of the data period with the exception of the Combat Fitness Test (CFT) score and Marine Corps Martial Arts Program (MCMAP) belt level.

a. Combat Fitness Test

Official scoring for the CFT was implemented in 2010. Prior to the CFT score collection (United States Marine Corps, 2008), the Physical Fitness Test (PFT) alone will serve as the proxy for measuring physical fitness. Although an individual Marine's PFT and CFT scores often vary, the objective of including this component in the quality score computation as a proxy for physical fitness level is maintained by including just the PFT. As indicated above, after 2010 both the PFT and CFT will be utilized in computing the tiered evaluation score.

b. Marine Corps Martial Arts Program Belt Level

The MCMAP was implemented in 2000 (Headquarters, United States Marine Corps, 2002). Prior to the implementation of this program, the point component for martial arts belt level is eliminated from the quality score computation. Eliminating this component from the calculation may reduce the overall precision of the tiered evaluation as it currently exists. However, utilizing the five remaining components of the quality tier calculation serves as an accurate measure of defining a quality Marine for the period prior to implementing the MCMAP.

E. LITERATURE REVIEW

The literature review included journal articles, research reports, and studies both within and outside the Department of Defense (DOD). A great extent of DOD research has focused on incentives for retaining quality personnel without consideration of how quality personnel are actually identified.

1. Quality in the DOD Civil Service

Asch (2001) analyzes the relationship between DOD Civil Service personnel quality and specific personnel outcomes. She measures personnel quality by education level, supervisor rating, and promotion speed and focuses on three personnel outcomes pay, promotion speed, and length of stay. Despite differences in the population group, personnel quality, and personnel outcomes, Asch's study utilizes a similar framework that is used during the course of this thesis.

2. Quality in the U.S. Army

Brown and Abowd (1990) notes that while quality indicators are often included as control variables in retention equations, the implications of those equations for the quality-mix of those staying and leaving are not clear. The study analyzes who stays across infantry, maintenance and administration occupations based on Armed Forces Qualification Test (AFQT), education level, and Skill Qualification Test (SQT), which could delineate how fast the individual had been promoted. The SQT characterizes the individual's proficiency in their occupational specialty periodically. Brown and Abowd examine individuals prior to re-enlistment and compared the quality of those that did and did not re-enlist. This thesis differs from Brown and Abowd's research in that it observes only those who re-enlist in order to determine whether the Marine Corps is identifying the correct Marines for retention.

3. USMC Retention Quality

Cole (2014) analyzes the USMC tiered evaluation system and its effect on improving retention quality. She uses data from fiscal year 2009 through 2014 to determine how the quality of the enlisted force had changed since implementation of the new tiered evaluation system. She discovers that although some individual metrics show improvement, overall quality had not improved and there was no proven difference in the quality of Marines retained under the new tiered system. Cole specifically notes that assessing whether the criteria used in the tiered evaluation system scoring are accurate measures of quality was beyond the scope of her research.

4. Measures of Military Success

Bownds (2004) measures military success by concentrating solely on first-term attrition but specifically notes that alternative measures of success could be studied. Specifically, he notes productivity, performance, and promotion all are commonly accepted indicators of military success. These three measures are all incorporated into the successful outcomes that will be measured in the course of this thesis. Performance and promotion will be directly measured and productivity will be measured as it indicated in the performance evaluation for each individual Marine.

F. BASIS FOR THIS STUDY

As the United States government faces record budget deficits the Marine Corps continues to face more stringent fiscal constraints. One outcome of the fiscal constraints is the downsizing of force that began in 2013 and is planned to continue through 2016 (Lagrone, 2013). The downsizing of the force presents a unique opportunity for the Marine Corps to ensure the most qualified personnel are identified and retained. By accurately identifying quality personnel, retention policies can be developed to appropriately target the quality personnel that are desired within the organization. A reduction in end strength shifts the balance of retention from quantity based to more of a quality based process. The penalties for failing to identify the right personnel to retain in the Marine Corps are higher personnel costs, reduced readiness, and reduced combat effectiveness.

G. RESULTS

The Marine Corps Tiered Evaluation System is valid at distinguishing individual quality but can be improved in many ways to better distinguish quality and aid the decision makers in the reenlistment process. Specifically, a modified tier system encompassing more tiers would better delineate individual quality especially among the larger tiers in the current tiered evaluation system. The lack of impact lower quality individuals have on the Marine Corps is revealed when evaluating future success measures. Lower quality Marines that are retained often do not get promoted and when they do they do so at much slower rates on average. Similarly, the career longevity for a

lower quality Marine that is retained is significantly lower than Marines designated higher quality. The USMC Tiered Evaluation System is the foundation for identifying quality Marines for retention. Improving this system will better aid stakeholders in the reenlistment process and improve overall quality and organizational effectiveness.

II. BACKGROUND

A. WHAT IS RETENTION?

Retention refers to the rate at which military personnel voluntarily choose to stay in the military after their original obligated term of service has ended (Kapp, 2013). The quantity of those retained is a concern if too few or too many people desire to remain. A shortage of experienced leaders, decreasing military efficiency, and lowering job satisfaction are the results of too few stayers (Kapp, 2013).

Kapp noted “more of a concern during a reduction in end strength is too many people staying resulting in decreasing promotion opportunities and possibly requiring involuntary separations in order to prevent the organization from becoming top heavy” (2013, p. 10). The primary objectives of the enlisted career force seek to prevent the Marine Corps from being “top heavy.”

B. ENLISTED CAREER FORCE OBJECTIVES: QUANTITY AND QUALITY

According to the USMC *Enlisted Retention and Career Development Manual*, the Marine Corps has two primary enlisted career force objectives: to provide the Marine Corps with the most qualified force by grade and MOS to support staffing of all authorized career force billets and to standardize promotion tempo across all MOSs to match time-in-service targets (Headquarters, United States Marine Corps, 2010). The first of these objectives reflects the need to balance both quantity and quality goals in order to maximize the value of personnel. This two-fold objective represents the balance that must be made within the Marine Corps retention program.

The requirements to meet both quantity and quality goals is just one of the demands that places added stress on USMC human resource programs. The end strength reductions outlined in the Fiscal Year 2013 National Defense Authorization Act demand even more from human resource programs and place additional emphasis on the need to improve the quality of existing retention programs. The USMC Enlisted Retention and Career Development Manual formally tasks the Enlisted Assignments Branch with

recommending management action to retain the most qualified Marines in the required quantities and skills (Headquarters, United States Marine Corps, 2010). However, the unique military challenges of a rigid pay table, educational incentives, and increased civilian competition often inhibit the retention of high-quality personnel (Brown, 1990).

1. Advantages and Disadvantages within Military and Marine Corps Retention

Military retention has considerable advantages and disadvantages when compared to the civilian sector. Likewise, the Marine Corps has distinct advantages when compared to other branches of the U.S. military.

a. Advantage of Military Retention

In general, military retention benefits from a challenging environment that rewards good performers and gets rid of poor performers. Research shows that retaining poor performers is detrimental to an organization (Collins, 2005, p. 44), yet providing challenge has been shown to increase job satisfaction (Judge, 2000) leading to higher retention. Although many factors that influence an individual's decision to remain or leave the service are outside the direct control of the military, identifying quality personnel correctly is one thing the service has control over and can certainly benefit from.

b. Disadvantages of Military Retention

Retaining employees is largely a concern of military organizations because it is imperative to have skilled, trained, and prepared enlistees in the ranks at all times (Dupre, 2007). The military, more so than most large civilian organizations, faces an extremely long lag time in the ability to produce a trained person to fill the gap of a person exiting the military service. The military, because of its bottom up and "grow from within" structure, cannot simply recruit from a pool of talented and skilled workers in the open job market like large civilian and other government organizations. The long lag time required to train a Marine places an even greater importance on ensuring retention policy is designed to identify and retain the correct Marines.

Other difficulties faced in military retention programs include a rigid pay table, educational incentives, and civilian competition (Brown, 1990). The rigid pay table and the lack of ability to “pay for performance” is an inhibitor to retention (Brown, 1990, p. 1). Additionally, educational incentives, such as the Post 9–11 G.I. Bill, which greatly enhance the ability to recruit individuals for military service, lure service members away from retaining in pursuit of other opportunities. General economic considerations such as low civilian unemployment also present challenges to recruiting and retention. When unemployment is low, civilian competition is high and the ability to retain individuals is much more difficult. Although the retention environment presents many challenges, the Marine Corps has little to no control over the aforementioned disadvantages. As a result, retention efforts must focus on identifying and retaining the most highly qualified individuals.

c. Advantage of USMC Relative to Other Services

When it comes to retaining quality, the Marine Corps has a distinct advantage over the other military branches because of its greater proportion of junior enlisted Marines. The proportion of first-term Marines retained is on average 24 percent compared to averages around 30 percent for the Army and approximately 50 percent for the Air Force and Navy (Congressional Budget Office, 2006). By retaining at smaller numbers, the Marine Corps can be more selective than other services when choosing whom to retain.

C. MARINE CORPS QUALITY SCREENING

The Marine Corps screens for quality at all levels from recruiting to retention however, the measures used to screen for quality differ among these levels.

1. Quality in Recruits

As mentioned previously, there has been a great amount of research conducted on recruit quality. Recruit quality is important as the enlistment cohort of today represents the reenlistment cohort of tomorrow. According to current Department of Defense enlistment standards, a high-quality recruit meets the following criteria: 1) has a high

school diploma or is in high school and expected to earn a diploma (Education Tier 1) and 2) has an AFQT score in categories I through IIIA. AFQT Score is determined using four subtests of the Armed Services Vocational Aptitude Battery (ASVAB): paragraph comprehension, word knowledge, mathematics knowledge, and arithmetic reasoning (Brown, 1990). The primary focus for recruit quality is on educational attainment and cognitive ability, however studies show that obtaining a high school diploma represents a degree of individual commitment, an important factor in lowering attrition (Kumazawa, 2010). As described later, the criteria used for determining quality among first-term Marines at their reenlistment point are more robust than the criteria for determining quality in recruits.

Although the Marine Corps, to a great degree, develops the quality traits it desires in an individual Marine, recruit quality standards provide a baseline for this development to begin. According to the DOD measure for fiscal year 2012, the Marine Corps achieved its highest level of recruit quality since the beginning of the All-Volunteer Force in 1973. High school diploma graduates comprised 100 percent of enlistees, and 75 percent scored above average on the AFQT (Kapp, 2013). Achieving all-time highs in recruit quality is an important achievement, however validating the process for identifying quality in first-term Marines is necessary to properly retain this quality.

2. Quality in First-Term Marines

The Enlisted Retention and Career Development Manual states that the quality of the non-commissioned officer and staff non-commissioned officer corps directly relates to the integrity and attention to duty of those officers and staff noncommissioned officers who provide retention recommendations used to influence the retention decision-making process (Headquarters, United States Marine Corps, 2010a). Similarly, career planners, managers of the retention process, are instructed to “encourage quality Marines to reenlist” (Headquarters, United States Marine Corps, 2010a, p. 3-1). The tiered evaluation system is one tool developed to assist the stakeholders involved in the retention process. The Marine Corps places emphasis on specific areas when measuring

quality in first-term Marines. These specific areas can be seen by examining each component of the quality score calculation under the tiered evaluation system.

3. Tiered Evaluation Components

The tiered evaluation system is comprised of seven components that are used as instruments in measuring quality.

a. Physical Fitness Test

The purpose of the PFT is to collectively measure general fitness Marine Corps-wide (United States Marine Corps, 2008). The PFT was specifically designed to test the strength and stamina of the upper body, midsection, and lower body, as well as the efficiency of the cardiovascular system. The PFT is conducted once a year between January 1 and June 30 and consists of three events, which include a 3.0 mile run, abdominal crunches, dead hang pull-ups for males and a flexed-arm hang for females. The minimum score varies by age group however, for ages 17 to 26 the minimum passing score is 135 with a maximum of 300 (United States Marine Corps, 2008). Each point on the PFT equals one point on a Marine's quality score.

b. Combat Fitness Test

The purpose of the CFT is to assess a Marine's physical capacity in a broad spectrum of combat related tasks (United States Marine Corps, 2008). The CFT was specifically designed to evaluate strength, stamina, agility, and coordination as well as overall anaerobic capacity. The CFT is conducted once a year between July 1 and December 31 and consists of three events, which include movement to contact, ammunition lift, and maneuver under fire. The movement to contact consists of a timed 880 yard run. The ammunition lift is a repetitive lift of a 30-pound ammunition can from shoulder height to overhead for a period of 2 minutes. The maneuver under fire is a 300 yard shuttle run that includes a variety of combat-related tasks, to include crawls, buddy drags/carries, ammunition re-supply, grenade throw and agility running. The minimum score varies by age group however, for ages 17–26 the minimum passing score is 190

with a maximum of 300 (United States Marine Corps, 2008). Each point on the CFT equals one point on a Marine's quality score.

c. Proficiency Marks in Service

Proficiency marks are assigned to indicate how well a Marine performed the primary duty during the marking period (United States Marine Corps, 2000). Proficiency marks are assigned to Marines in pay grades E4 and below. Specific guidance states in addition to technical skills and specialized knowledge relating to duty proficiency marks, the "whole Marine concept" must be considered (United States Marine Corps, 2000). Such attributes as mission accomplishment, leadership, intellect and wisdom, individual character, physical fitness, personal appearance, and completion of professional military education, Marine Corps Institute courses, and off duty education should also be evaluated and incorporated in the proficiency mark. Proficiency marks are generally assigned twice a year; however, more than two occasions can occur in a given year. For example if a Marine transfers, is sent on temporary additional duty for more than 30 days or has a change in pay grade additional marks would be given. Proficiency marks range from 0.0 to 5.0 (United States Marine Corps, 2000). Further guidance on how to assign markings is provided in Figure 1. Average proficiency marks for the duration of the Marine's service are multiplied by 100 when computing an individual Marine's quality score.

Figure 1. Proficiency Marks Scale
(after Headquarters, United States Marine Corps, 2000)

MARK	CORRESPONDING ADJECTIVE RATING	STANDARDS OF PROFICIENCY
0.0 to 1.9	Unacceptable	Does unacceptable work in most duties, generally undependable; needs considerable assistance and close supervision on even the simplest assignment.
2.0 to 2.9	Unsatisfactory	Does acceptable work in some of the duties but cannot be depended upon. Needs assistance and close supervision on all but the simplest assignments.
3.0 to 3.9	Below Average	Handles routine matters acceptably but needs close supervision when performing duties not of a routine nature.
4.0 to 4.4	Average	Can be depended upon to discharge regular duties thoroughly and competently but usually needs assistance in dealing with problems not of a routine nature.
4.5 to 4.8	Excellent	Does excellent work in all regular duties, but needs assistance in dealing with extremely difficult or unusual assignments.
4.9 to 5.0	Outstanding	Does superior work in all duties. Even extremely difficult or unusual assignments can be given full confidence that they will be handled in a thoroughly competent manner.

d. Conduct Marks in Service

Reporting occasions for conduct marks coincide with the same occasions as those for proficiency marks. Specific guidance provided states that in addition to observance of the letter of law and regulations, conduct includes conformance to accepted usage and custom, and positive contributions to unit and Corps (United States Marine Corps, 2000). General bearing, attitude, interest, reliability, courtesy, cooperation, obedience, adaptability, influence on others, moral fitness, physical fitness as effected by clean and temperate habits, and participation in unit activities not related directly to unit mission, are all factors of conduct and should be considered in evaluating the Marine (United States Marine Corps, 2000). Non-judicial punishment and courts martial are a major factor when determining conduct marks. Conduct marks range from 0.0 to 5.0 (United States Marine Corps, 2000). Further guidance on how to assign markings is provided in Figure 2. Average conduct marks for the duration of the Marine's service are multiplied by 100 when computing an individual Marine's quality score.

Figure 2. Conduct Marks Scale
(after Headquarters, United States Marine Corps, 2000)

MARK	CORRESPONDING ADJECTIVE RATING	STANDARDS OF CONDUCT
0.0 to 1.9	Unacceptable	Habitual offender. Conviction by general, special, or more than one than one summary court-martial. Give a mark of "0" upon declaration of desertion. Ordered to confinement pursuant to sentence of court-martial. Two or more punitive reductions in grade.
2.0 to 2.9	Unsatisfactory	No special court-martial. Not more than one summary court-martial. Not more than two non-judicial punishments. Punitive reduction in grade.
3.0 to 3.9	Below Average	No court-martial. Not more than one non-judicial punishment. No favorable impression of the qualities listed in paragraph 4007.6a. Failure to make satisfactory progress while assigned to the weight control or military appearance program. Conduct such as not to impair appreciably one's usefulness or the efficiency of the command, but conduct not sufficient to merit an honorable discharge.
4.0 to 4.4	Average	No offenses. No unfavorable impressions as to attitude, Interests, cooperation, obedience, after-effects of intemperance, courtesy and consideration, and observance of regulations.
4.5 to 4.8	Excellent	No offense. Positive favorable impressions of the qualities listed in paragraph 4007.6a. Demonstrates reliability, good influence, sobriety, obedience, and industry.
4.9 to 5.0	Outstanding	No offenses. Exhibits to an outstanding degree the qualities listed in paragraph 4007.6a. Observes spirit as well as letter of orders and regulations. Demonstrates positive effect on others by example and persuasion.

e. Rifle Score

The purpose of the rifle range is to progress the individual Marine from the fundamentals of marksmanship to advanced combat shooting (Headquarters, United States Marine Corps, 2014). Training is an annual requirement to review, practice, and evaluate marksmanship skills (Headquarters, United States Marine Corps, 2014). Qualifying scores range from 250–350. Each point on the rifle qualification score equals one point on a Marine's quality score.

f. Marine Corps Martial Arts Program Belt

The MCMAP provides a systematic training regimen for the mental, character, and physical development of Marines (Headquarters, United States Marine Corps, 2002). Mental development includes the development of the combat mindset and the study of the art of war. Character development stresses the importance of the Marine's place as a warrior on the battlefield as well as a functional member in society. Lastly, fighting techniques and battlefield fitness are part of physical development (Headquarters, United States Marine Corps, 2002). The MCMAP has 10 different belt levels ranging from tan to 6th degree black belt. Additionally, there are multiple levels of instructors and instructor trainers. A Marine obtains 0 to 100 points toward his quality score depending on belt level and instructor status. For example, a Marine with a tan belt is awarded 5 points whereas a Chief Instructor is awarded 100 points.

g. Meritorious Promotion

Meritorious promotions are reserved for exceptionally well-qualified Marines in recognition of outstanding leadership and performance (Headquarters, United States Marine Corps, 2012). Meritorious promotions are intended to promote Marines whose performance is superior to that of their peers, or to promote Marines for specific actions/superior achievement (Headquarters, United States Marine Corps, 2012). If a Marine was meritoriously promoted to his current pay grade, the Marine is awarded 100 points toward his quality score.

4. Quality Score Computation

The quality score is computed by summing the total of the scores for each of the seven components. The quality score serves as the basis for the quality tier assignment discussed later. The quality breakdown by total points, weight of total possible score and average values for the data set are shown in Table 1.

Table 1. Quality Score Calculation Overview and Weighting

Component	Possible Points	% of Total Possible Score	Average Value for Data Set	% of Total Possible Score for Average Value
Proficiency Marking	500	23.3%	443	20.6%
Conduct Marking	500	23.3%	442	20.6%
Rifle Score	350	16.3%	243	11.3%
PFT Score	300	14.0%	232	10.8%
CFT Score	300	14.0%	254	11.8%
MCMAP Belt Points	100	4.7%	9.19	0.4%
Meritorious Promotion	100	4.7%	10.5**	4.7%
Total	2,150		1,633.5	
*Rifle score was changed from a 250 point scale to a 350 point scale in 2007, average for FY2012 reenlistments is 301 points.				
**Meritorious Promotion value is either 0 or 100; average for entire data set is shown.				

D. USMC FIRST TERM ALIGNMENT PROGRAM

The First Term Alignment Program (FTAP) is the retention program used to reenlist first-term Marines. The FTAP guides the overall administration of first term Marine reenlistments. The mission of FTAP is to meet career force requirements, while preventing promotion stagnation and ensuring opportunities for advancement (Headquarters, United States Marine Corps, 2010a). This mission closely aligns with the enlisted career force objectives discussed previously. In accordance with time in service promotion targets, corporals and sergeants comprise the majority of individuals in the FTAP population and therefore are the primary starting point of this research. The FTAP recommendations, pre-requisites, time in service limitations, and quality tier assignment process are explored further in the following paragraphs.

1. Reenlistment Recommendations

The Tiered Evaluation System has changed the way Marines are evaluated and recommended for reenlistment.

a. Historical Process

Prior to the tiered evaluation system, the certifying officer (normally, the Marine's commanding officer) made one of four recommendations on a Marine's Reenlistment, Extension, Lateral Move (RELM) request based on a limited amount of information. The four possible recommendations are "with enthusiasm," "with confidence," "with reservation" and "not recommended." According to the Enlisted Retention and Career Development Manual, the certifying officer should recommend with enthusiasm if the Marine is in the top 25 percent of Marines in that grade known to the certifying officer (Headquarters, United States Marine Corps, 2010a). A weakness to the historical approach is the subjectivity of the assessment. Historically, the recommendation was based solely on the certifying officer's knowledge of the reenlisting Marine without access to the information comparing the Marine to the entire population of his peers. Although the certifying officer's recommendation still plays a large part in the reenlistment process, the tiered evaluation system seeks to reduce subjectivity by introducing this peer comparison component into the reenlistment process.

b. Tiered Evaluation System

The tiered evaluation system, implemented in 2011, ranks Marines in a given pay grade and MOS across the entire Marine Corps according to their quality score. This system provides the certifying officer with information on how the individual Marine compares to the entire population of his peers. The historical system relied solely on the certifying officer's experience whereas this system provides an objective base for the certifying officer to formulate his reenlistment recommendation. The information provided by the Tiered Evaluation System enhances the information available to stakeholders in the reenlistment approval process.

2. Basic Reenlistment Prerequisites

The Enlisted Retention and Career Development Manual lists more than twenty reenlistment prerequisites, many of which are focused on legal or disciplinary issues but there are a few that specifically target individual quality measures. Specifically, prerequisites for minimum proficiency and conduct marks are 4.0/4.0, although this can be waived by HQMC. Additionally, Marines must pass a full, current physical fitness test and combat fitness test unless previously waived by a permanent limited duty board. Lastly, first-term Marine re-enlistees must possess a high school diploma or alternate credential (Headquarters, United States Marine Corps, 2010). These reenlistment prerequisites help initially shape the quality of retained personnel by creating an eligible pool of qualified individuals for retention.

a. Time-in-service Limitations

In addition to basic reenlistment prerequisites, time-in-service limitations may apply to individuals in cases where the individual did not meet target promotion requirements. The Manpower Plans Programs and Budget Branch establishes service limitations as part of Enlisted Career Force Controls (ECFC). Enforcement of service limitations improves promotion opportunities for junior Marines and helps meet the enlisted career force objective to standardize promotion tempo. Updated in 2014 (United States Marine Corps, 2014), the current service limitations for junior Marines are listed in Table 2.

Table 2. USMC Enlisted Service Limitations
(after United States Marine Corps, 2014)

Rank	Years of Service
Corporal	8
Sergeant	10
Staff Sergeant	20

For example, a Marine Sergeant cannot exceed 10 years' time in service without being promoted to Staff Sergeant. A Marine at his service limitations will be involuntary separated or retired if eligible from the Marine Corps.

3. Quality Tier Assignment.

A Marine is assigned to a quality tier on July 1st of the year prior to the fiscal year of his end of active service (EAS) date. For instance, if a Marines' EAS date is January 15, 2016, his quality score would be calculated based on all the quality score component information in the system on June 30, 2015. The same process is completed for every Marine with an EAS date in the same fiscal year. Once the quality scores for all Marines are calculated, they are segregated by primary military occupational specialty (PMOS) and cutoff scores for the tiers are identified. The top 10 percent of Marines in a given PMOS are assigned to Tier 1, the next 30 percent are assigned to Tier 2, the next 50 percent to Tier 3, and the bottom 10 percent assigned to Tier 4.

E. IMPROVING RETENTION QUALITY

Research shows that one way to improve the quality of retention programs is through incentives that increase job satisfaction (Collins, 2005, p. 49). In Collins' book *Good to Great*, he states "The purpose of a compensation system should not be to get the right behaviors from the wrong people, but to get the right people on the bus in the first place, and to keep them there. Another way to improve the quality of retention programs is by accurately identifying the quality people the organization desires to retain. This is the focus of this research and part of what Collins considers "keeping them there."

Dupre (2007) notes that although the military may not always have the flexibility to change organizational standards and job specifications to remain competitive and functional, there is a significant amount of control over how they manage personnel. Identifying quality Marines is one way the Marine Corps can exercise control of personnel management and also the primary focus of this thesis.

Waal in his article on high performance organizations lists long-term improvement and employee quality as factors of high performance (Waal, 2012). Additionally, when Collins analyzed 11 companies, 10 of the 11 highly successful companies grew their company executive officer from within (Collins, 2005, p. 10). The military, with its closed organizational structure, is the type of organization that does exactly that, grows from within.

F. CONCLUSION

Recruiting and retaining quality employees is a common goal of any successful organization. The USMC screens for quality in recruits however the traits used in recruit screening must attempt to predict future performance. The first opportunity for a well-defined performance based assessment to shape the quality of manpower occurs at the end of a Marines' first term of enlistment. The FTAP is the process used to evaluate and screen individual Marines to meet career-force requirements (Headquarters, United States Marine Corps, 2010a). The relatively low rate of retention within the USMC provides a distinct advantage in the degree of selectivity the organization has in comparison to other branches in the U.S. Military. The Tiered Evaluation System is an important tool to aid stakeholders in the retention process to ensure the highest quality Marines are identified for retention.

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III. DATA OVERVIEW

A. DATA SOURCES

Data for this research were provided by two entities, The Total Force Data Warehouse (TFDW) and the Marine Corps Promotions Branch (MMPR). TFDW provided pooled, cross-sectional data for the Marine Corps total force grouped by fiscal year and enlistment cohort. The data spans from fiscal year 1995 to 2014. These data are used to generate a quality score and replicate quality tier placement based on the current quality tier metrics. Additionally, TFDW provides the required data to evaluate three of the four success measures in this research, namely promotion speed, career longevity, and physical fitness. Furthermore, MMPR provided fitness report values for the years 1995 to 2014 for retained FTAP Marines. The performance averages for retained FTAP Marines are used to evaluate the final success measure outlined in this research.

B. SUMMARY STATISTICS

The useable data set includes 317,468 Marines enlisting between fiscal year 1995 and 2009. Variables used in the quality tier placement are outlined in Table 3.

Table 3. Variables used for Quality Score Calculation and Quality Tier Placement

Variable	Obs	Mean	Std. Dev.	Min	Max
PFT Score	317,468	232.8	51.3	0	300
CFT Score	53,960	243.4	94.8	0	300
Rifle Score	317,468	231.8	49.3	0	348
MCMAP Points	289,063	4.0	5.9	0	90
Proficiency Points	317,468	438.0	18.8	0	490
Conduct Points	317,468	435.6	23.8	0	490
Meritorious Points	317,468	7.4	26.1	0	100
Quality Score	317,148	1390.5	160.6	353	2005
Tier Override	52,391	2.4	0.6	2	4
Term of Enlistment	316,511	4.2	0.4	4	6
Tier Assignment	317,468	2.6	0.8	1	4
Tier 1 Cutoff	317,468	1489.8	141.1	1313	1927
Tier 2 Cutoff	317,468	1418.7	136.7	1202	1866
Tier 3 Cutoff	317,468	1281.9	112.4	868	1697
Reenlistment FY	317,468	2006.2	3.8	2000	2012

Prior to the tier placement, Marines are grouped by FTAP reenlistment cohort. Total Marines in each reenlistment cohort and the number of Marines that reenlisted that year are used to evaluate future success are listed in Table 4. The Marine Corps has averaged a 24 percent retention rate in recent years however in fiscal years 2006, 2007, and 2008 the rates were much higher due to authorized end strength increases. The number of Marines in Table 4 depicted as “Reenlisted Population” varies slightly from the total population of individuals that actually reenlisted in a given fiscal year for reasons described in the Issues and Remedies section later. Additionally, the number of Marines by tier and reenlistment recommendation are presented in Table 5. The reenlistment recommendation is normally entered in the personnel system for each individual approximately 6 months prior to the ECC (Headquarters, United States Marine Corps, 2010a). As presented in Table 5, only 51 percent of Marines assigned to Tier 4 are recommended and eligible to reenlist, compared to 94 percent of Tier 1 Marines. This listed as other are assigned to one of many less frequently assigned reenlistment recommendations such as in service drug involvement or failure to meet physical/medical standards.

Table 4. Total Number of Marines by FTAP Reenlistment Cohort

Reenlistment Fiscal Year	Reenlistment Cohort Population	Number Reenlisting	Percentage Reenlisting
2000	24,715	5,354	21.7%
2001	23,454	5,308	22.6%
2002	23,644	5,202	22.0%
2003	23,446	5,315	22.7%
2004	22,579	4,986	22.1%
2005	21,424	4,935	23.0%
2006	26,059	6,586	25.3%
2007	22,812	7,935	34.8%
2008	23,558	7,488	31.8%
2009	25,146	6,418	25.5%
2010	26,399	6,371	24.1%
2011	28,057	6,025	21.5%
2012	26,175	5,894	22.5%
Total	317,468	77,817	

Table 5. Number of Marines by Tier and Reenlistment Recommendation Code

Tier	Number Assigned to Tier (% of total)	Number Recommended and Eligible (% of tier)	Number Not Recommended (% of tier)	Number in Other Categories (% of tier)
Tier 1	31,237(9.8%)	29,341(93.9%)	254(0.8%)	1,589(5.1%)
Tier 2	96,018(30.2%)	87,585(91.3%)	1,518(1.6%)	6,822(7.1%)
Tier 3	157,793(49.7%)	130,428(82.7%)	6,168(3.9%)	21,084(13.4%)
Tier 4	32,420(10.2%)	16,580(51.2%)	5,422(16.8%)	10,363(32.0%)
Total	*317,468(100%)	263,934(83.1%)	13,362(4.2%)	39,858(12.6%)
*314 (0.1%) of the individuals in the data set do not have a reenlistment code				

C. ISSUES AND REMEDIES

1. Proficiency and Conduct Marks

Prior to 1999 proficiency and conduct marks data storage was inconsistent and is deemed insufficient to accurately serve as the basis for quality tier placement. Considering the tier placement is made in June prior to the reenlistment fiscal year beginning, the first useable FTAP reenlistment cohort is fiscal Year 2000. The fiscal Year 2000 reenlistment cohort is comprised of Marines with six-year initial terms of enlistment from 1995, five-year terms from 1996 and four-year terms from 1997.

2. Specific MOS Designators

Approximately one percent or 3,500 Marines in the original data set lack a four digit specific PMOS designator or are still designated as a Marine with a Basic Enlistment Guarantee at the time of the tier placement. There are myriad issues that could cause this missing designator including in-progress lateral moves and failures to graduate from MOS school. The small percentage of these individuals were removed from the dataset prior to data analysis.

3. Low Density PMOS'

The tier placement for low density PMOS' lacks precision as the tier cutoffs are not appropriately assigned. For example, if a given PMOS includes four individuals in

the FTAP reenlistment cohort, the top individual would be assigned to Tier 1, the next three to Tier 2, and none would be assigned to Tiers 3 and 4. For the purpose of this research, low density PMOS' are defined as those with fewer than 20 individuals. Low density MOS' were dropped from the data set. In total, this included approximately 6,700 Marines that were dropped from the original data set representing approximately 2 percent of the useable data set.

4. Censored Data

A primary concern for this analysis is censored data since a large percentage of the population is still serving. This issue is accounted for by creating conditional variables that limit individuals included in the regression analysis based on minimum time requirements. These conditional variables ensure those whom reenlist at the latter end of the data set are not evaluated using the same criteria as individuals entering in the early years of the data set. Censored data is a factor when evaluating both career longevity and promotion speed. Conditional variables are discussed in further detail later in the research.

D. SUCCESS MEASURES

The success measures for this research are defined in terms of promotion speed, career longevity, physical fitness levels, and performance evaluation averages. Success measures are observed only for individuals reenlisting at their first reenlistment point. Comparisons of success measures across the four quality tiers occur later in the research.

1. Promotion Speed

Promotion speed is an important factor in determining success because one would expect that Marines identified as higher quality exhibit traits that would also lead them to be promoted more quickly than lower quality Marines. The Marine Corps sets time in service promotion targets in order to standardize promotion tempo across all MOSs. In 2014, updated time in service promotion targets were published as listed in Table 6 (United States Marine Corps, 2014).

Table 6. USMC Enlisted Time in Service Promotion Targets
(after United States Marine Corps, 2014)

Rank (Pay grade)	Years of Service
Sergeant (E5)	4
Staff Sergeant (E6)	8.5
Gunnery Sergeant (E7)	13

2. Career Longevity

Career longevity is often an outcome of job satisfaction, which may be attributed to individual quality and/or the success of the organization's practices or culture. In the military, since there is a prescribed period of obligated service, career longevity as a measure of success may have less significance in the early stage of a career

The results of previous retention studies have shown that most individuals leaving after their first term of military service could have stayed otherwise (Brown, 1990). In a 1992 study, job satisfaction was one of the most important predictors in soldier's intentions to remain in the Army (Dupre, 2007). Beyond the obligated period of service, the voluntary decision to leave cannot be directly attributed to a lack of success on the part of the individual because high quality individuals may voluntarily leave the Marine Corps. However, observing follow-on retention decisions of individuals across the quality tiers can serve as a predictor of successful organizational practices that seek to retain the highest quality individuals. Additionally, career longevity, when it comes to higher quality individuals, can be an indicator that the stakeholder's in the enlisted retention process are meeting performance objectives and appropriate job matching is occurring (Dupre, 2007).

3. Physical Fitness Level

The Marine Corps Physical Fitness Program, outlined in Marine Corps Order 6100.13, emphasizes the requirement for all Marines to adopt a lifelong commitment to fitness. The order states "physical fitness is an indispensable aspect of leadership and a commitment to physical fitness has a direct and positive impact on job performance and combat readiness" (Page 1-1). These impactful words show the importance placed on physical fitness within the Marine Corps. The PFT score can serve as more than just a

proxy for physical fitness, it can also serve as an indicator of individual motivation, performance, dedication, and overall organizational compatibility.

4. Performance Evaluation Averages

Performance evaluations are provided to Marines in pay grades E5 and above at a minimum of once annually. Performance evaluations or fitness reports (FitRep's) are a good measure of success because they provide reporting, recording, and analysis of the performance and professional character (Headquarters, United States Marine Corps, 2010b). The two FitRep values used in the conduct of this research are the average cumulative values for both the reporting senior and the reviewing officer.

a. Reporting Senior Relative Cumulative Value

The Reporting Senior Relative cumulative value (RSRV cumulative) is based on an 80 to 100 percent normalizing scale, with 90 percent considered as the average for a reporting senior's profile. This value serves as an indicator of how the Marine reported on (MRO) performs in comparison to his peers evaluated by the same reporting senior over the course of the reporting senior's career (Headquarters, United States Marine Corps, 2010b). In the majority of cases, the reporting senior, from whom this value originates, is the first officer in the Marine's reporting chain.

b. Reviewing Officer Cumulative Value

The second value used to evaluate the FitReps is the Reviewing Officer Cumulative Value (ROCV). The ROCV normalizes the reviewing officer's markings over the course of the reviewing officer's career and keeps a cumulative record of how the MRO's FitRep stands over time. Reviewing officer cumulative values are based on a tier assignment from 1 to 8 with 1 being unsatisfactory and 8 being the eminently qualified Marine (Headquarters, United States Marine Corps, 2010b). Scores are normalized with a value of zero representing the reviewing officer's average. Negative values represent below average and positive values represent above average. A value of 1 indicates the individual is 1 tier level above the reviewing officer's average. In the majority of cases, the reviewing officer, from whom this value originates, is the second

supervisor in the Marine's reporting chain. The reference to tier assignment for the ROCV should not be confused with the tier assignment used in the Tiered Evaluation System.

E. SUMMARY

This chapter introduces the data for the analysis. Additionally, a remedy is presented for each issue existing in the raw data. Lastly, this chapter outlines the four success measures defined in this research and provides the foundation for the methodology introduced in Chapter V.

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IV. METHODOLOGY

A. TECHNIQUES APPLIED

1. Replicating the Tiered Evaluation System

The first step in preparing the data for analysis was replicating the current tiered evaluation system on pre-tier individuals.

a. Building Reenlistment Cohorts

Reenlistment population cohorts are built for each fiscal year combining individuals from multiple enlistment cohorts with varying initial service contract lengths. For example, the 2011 reenlistment cohort included individuals enlisting in 2005 with six-year contracts, 2006 with five-year contracts, and 2007 with four-year contracts.

b. Quality Score Calculation

The quality score calculation uses the seven scoring variables PFT, CFT, Rifle, MCMAP Belt Level, Average Proficiency, Average Conduct, and Meritorious Promotion. The quality score is calculated on June 30th prior to the fiscal year of a Marine's EAS date. The most recent PFT, CFT, and Rifle scores from the current scoring period are used for the calculation. The MCMAP belt level held at the time of the June 30th snapshot was converted to points by assigning the number of points, as shown in Table 7. Averages in service proficiency and conduct marks were multiplied by 100 prior to inclusion in the calculation. Lastly, if a Marine was awarded a meritorious promotion to the rank held at the time of the June 30th snapshot, an additional 100 points is awarded to the overall quality score. The meritorious promotion points are assigned to anyone with a date of rank equal to the 2nd day of any month, the effective date of all meritorious promotions. If legal action occurred on the 2nd day of the month and matched the individual's date of rank, the 100 points are removed from the calculation as the date of rank coincides with the Marines' reduction vice meritorious promotion.

Table 7. MCMAP Belt Point Scale (after B. Lodge, personal Communication, September 11, 2014)

Belt Code	Description	Point Value
MMA	Not Trained	0
MMB	Tan Belt	5
MMC	Gray Belt	10
MMD	Green Belt	15
MMF	Brown Belt	20
MMH	Black Belt, 1st Degree	25
MMM	Black Belt, 2nd Degree	30
MMN	Black Belt, 3rd Degree	35
MMP	Black Belt, 4th Degree	40
MMQ	Black Belt, 5th Degree	45
MMR	Black Belt, 6th Degree	50
MME	Green Belt Martial Arts Instructor	60
MMG	Brown Belt Martial Arts Instructor	70
MMJ	Black Belt, 1st Degree Martial Arts Instructor	80
MMK	Black Belt, 1st Degree Martial Arts Instructor 1st Degree	90
MML	Black Belt, 1st Degree Martial Arts Instructor 2nd Degree	95
MMS	Chief Instructor	100

c. Tier Placement

Tier placements are made by selecting all Marines from a given PMOS in the fiscal year reenlistment cohort and establishing cutoffs at the 10th, 60th, and 90th percentiles representing the four quality tiers outlined in Table 8. These cutoffs are calculated by generating percentiles for each PMOS and subsequently assigning each Marine to a quality tier. A Marine's legal history was used to reassign tier placement in order to accurately replicate the current tiered evaluation process. Marines subject to one non-judicial punishment (NJP) cannot be higher than Tier 2, two NJPs cannot be assigned higher than Tier 3, and any court martial could not be higher than Tier 4. A tier override variable was created to enforce these legal history restrictions. After the reassignment for legal history, the four quality tiers, although accurate, are not precisely 10, 30, 50, and 10 percent respectively. In total, 317,468 Marines who enlisted from 1995 to 2009 were placed in quality tiers. An overview of the tier assignments is shown in Table 9.

Table 8. Quality Tier Overview (after B. Lodge, Personal Communication, September 11, 2014)

Tier	Tier Description	Tier %	Population %
1	Eminently Qualified	10	91-100
2	Highly Competitive	30	61-90
3	Competitive	50	11-60
4	Below Average	10	1-10

Table 9. Tier Assignment Overview

Tier	Freq.	Percent
1	31,237	9.8
2	96,018	30.2
3	157,793	49.7
4	32,420	10.2
Total	317,468	100.0

2. Measuring Future Outcomes

a. Promotion Speed

Promotion speed is determined by utilizing the individual Marine's pay grade history. A new variable, "months in grade" is created to calculate the difference in the date of rank between the current and former rank. The result is the number of months the individual Marine spent in grade. Months in grade is compared within the same grade across the various quality tiers. The analysis is limited to promotions to the grade of E6 and E7.

b. Career Longevity

Career longevity is measured utilizing the total months a Marine served by calculating the difference between the Armed Forces Active Duty Base Date (AFADBD) and the Expiration of Active Service (EAS). Longevity can be determined up to the end date of the data set, December 31, 2014. They are specifically designated as currently serving and are discussed further later in the research. Career longevity is then compared across the various quality tiers.

c. Physical Fitness Score

For the purpose of this research, physical fitness is measured two years after the first reenlistment. The selected measure for each individual is the PFT that has the nearest date occurring after the first reenlistment date plus two years. In most cases three years has elapsed between the PFT score at the time of the quality tier placement and the selected PFT at two years after first reenlistment. This PFT score is compared to the PFT at the time of quality tier placement and across the various quality tiers.

d. FitRep Averages

Similar to promotion speed, FitRep averages are used to compare individual quality across the various quality tiers. FitRep's are provided to Marines in pay grade E5 and higher. In accordance with promotion targets, many Marines reenlist prior to being promoted to E5. Therefore, FitRep values may not be immediately available at the first reenlistment point. FitRep data obtained from the Promotions Branch extends 6 years from the first reenlistment date to account for this potential gap in reportable information.

B. REGRESSION OVERVIEW

The Ordinary Least Squares regression method is used in the analysis of the success measures. Dependent variables are a combination of continuous and dichotomous outcomes. The models are validated through visual inspection of the residuals and testing for heteroskedasticity using the Breusch-Pagan test. With the exception of regressions measuring career longevity using dichotomous outcomes, all other regressions incorporate robust standard errors to correct for the presence of heteroskedasticity.

1. Goals

The goal of the regression analysis is to gather evidence to answer the following research questions.

- Is the tiered evaluation system a valid predictor of future success?

Validating the tiered evaluation system as a predictor of future success will help stakeholders in the reenlistment process make better informed decisions. The goal is to

determine if the stated success outcomes have an increasingly positive effect as the tier assigned increases.

- Can value be gained through a modified tier system?

A modified tier system is beneficial if it can better distinguish quality among individuals to aid stakeholders in the reenlistment process. The goal is to determine if the variance within the largest two tiers comprising 80 percent of the total FTAP reenlistment cohort population can better distinguish individual quality when divided into smaller sub-tiers.

- Is the quality score weighted correctly? Should all occupational fields have the same weight for the quality score components?

If certain components of the quality score have no bearing on future success, then that component should be deemphasized for the quality score. Furthermore, different components may have varying importance for future success across occupations. The goal of these models is to identify how much each component contributes to future success and how that differs by occupational field.

2. Dependent Variables

Nine dependent variables are used to evaluate the selected success measures.

a. Promotion Speed

Promotion speed is measured in terms of time to E6 and E7. Promotion speed is calculated using the difference in time between the rank of interest and the previous rank. For example months to E6 is calculated using the difference in the E5 and E6 date of rank. This calculation was used instead of total time in service in an attempt to baseline individuals from various quality tiers and remove previous effects from the analysis.

Conditional variables are used to account for censored data in all promotion speed regressions. Minimum dates of rank variables are created for promotion to E6 and E7. These variables use a proxy for time it takes to get promoted to the specific pay grade of interest. The proxy is established based on the time to achieve the rank for the 95th percentile of the Marines in the data set. The individual is included in the regression only when his prior rank date plus

the time at the 95th percentile to the rank occurred prior to December 31, 2014, which is the data end date. If the individual does not meet these criteria, it is assumed that he did not have ample time to be promoted to the rank of interest and is therefore excluded from the regression regardless of whether he was actually promoted to the rank. For example, an individual with an E5 date of rank of June 1, 2007 would have a calculated minimum date of rank to E6 of September 1, 2013, his E5 date of rank plus the 95th percentile time it takes to achieve E6. This minimum date calculation occurs prior to December 31, 2014 so therefore this Marine is included in the regression to E6. Likewise, the same individual would be excluded by the minimum date of rank calculation for the E7 promotion speed regression because he would not meet the minimum date of rank requirement by December 31, 2014. The 95th percentiles are 75 months to E6 and 78 months to E7. Thus the cutoff date of rank to E5 for “months to E6” is October 1, 2009. Similarly, the cutoff date of rank to E6 for “months to E7” is July 1, 2009.

b. Career Longevity

Career longevity is measured at four established time benchmarks of 6, 8, 10, and 12 years beyond the first reenlistment date. These binary dependent variables designate those individuals meeting the specific time benchmark.

Conditional variables are used to account for censored data in all longevity regressions. Four time benchmark variables for career longevity are created to account for minimum time requirements for inclusion in longevity regressions. Specifically these benchmarks are established at six, eight, ten, and twelve years beyond the first reenlistment date. Only those who reenlisted at least 6, 8, 10, and 12 years (depending on the outcome) before December 31, 2014, are used in a given regression so as to give time to the person to realize both outcomes of staying a given number of years or leaving. Six years is chosen as the first benchmark in an attempt to capture the effects of individuals that have made a decision to reenlist for a second time. Additional factors of eight, ten and twelve years are chosen to measure at frequent intervals in order to capture the majority of individuals reenlisting earlier in the data set. Any measure beyond 12 years after the first reenlistment would exclude such a large portion of the data set that it would add little value to the overall analysis.

c. Physical Fitness Test

Physical fitness test is included as a success outcome to determine if correlation exists among various tier assignments. The selected PFT for each individual was the PFT that had the nearest date occurring after the first reenlistment date plus 2 years.

d. Performance Evaluation Averages

Performance evaluation averages are measured using two variables RSRV cumulative average and ROCV average. For the purpose of this research, these values are averaged over a 6-year period following the individual's first reenlistment point. These values are not weighted by the number of months the reports covered; therefore, each report that has values assigned is evenly weighted regardless of time covered.

Summary statistics for each dependent variable are presented in Table 10.

Table 10. Summary Statistics for Dependent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Months to E6	28,802	49.114	12.990	7.986	151.101
Months to E7	7,908	53.378	14.027	6.047	133.027
Stay 6	77,817	0.362	0.481	0.000	1.000
Stay 8	77,817	0.236	0.425	0.000	1.000
Stay 10	77,817	0.137	0.344	0.000	1.000
Stay 12	77,817	0.074	0.262	0.000	1.000
PFT Reenl + 2 years	62,664	245.468	33.341	0.000	300.000
RSReIVal Cumulative	36,218	89.913	3.706	80.000	100.000
ROCV Cumulative	37,003	-0.079	0.821	-4.535	3.259

3. Key Sets of Explanatory Variables

Four key sets of explanatory variables were used in the regression analysis.

a. Tier Assignment

The tier assignments currently used in the USMC Tiered Evaluation System serve as primary variables in select regressions. The estimates on tier assignment variables

provide the foundation for analyzing differences each tier assignment is predicted to have on the various success measures.

b. Modified Tier Assignment

Modified tier assignments are utilized as primary variables in select regressions. The modified tier assignment uses six tiers created by splitting tiers 2 and 3. Tiers 2 and 3 are split into subgroups labeled 2a, 2b, 3a, and 3b. In the current tiered evaluation system, tiers 2 and 3 consist of 80 percent of a total reenlistment cohort. Tier 3 alone consists of 50 percent of the individuals Marines in a reenlistment cohort. Splitting these large quality groups provides evidence if a modified tier system could be a more accurate predictor of future success. The six tier assignments under the modified tier system are outlined in Table 11.

Table 11. Tiered Evaluation System Compared to Modified Tier System

USMC Tiered Evaluation System			Modified Tier System		
Tier	Tier %	Population %	Tier	Tier %	Population %
1	10	91-100	1	10	91-100
2	30	61-90	2a	15	76-90
3	50	11-60	2b	15	61-75
4	10	1-10	3a	25	36-60
			3b	25	11-35
			4	10	1-10

c. Standardized Quality Score Components

The individual quality score components are used as primary variables in select regressions. The quality score metrics include PFT Score, Rifle, Proficiency Marks, Conduct Marks, and Meritorious Promotion. MCMAP Belt Level and CFT Score were not included as controls because these measures were not present over the entire duration of the data set. Prior to including each quality score component in the regression, each component is standardized to have a mean of zero and a standard deviation of one. The standardized z-scores allow for easier interpretation among differently scaled items. The

quality score components are chosen as a control variable in order to determine the predictive effect these components have on the selected success measures.

*d. **Standardized Quality Score***

Quality Score is used as a primary variable in select regressions. Prior to including in the regression quality score was standardized to have a mean of zero and a standard deviation of one. Controlling for quality score provides the foundation for analyzing changes in the quality score and their predictive effect on the various success measures.

4. Control Variables

Control variables are chosen for the regressions to control for differences that occur over time or within specific occupational specialties. Fiscal year of first reenlistment and PMOS are control variables used in all of the regressions. Interacting these variables creates fixed effects, which adds to the validity of the outcomes and regression analysis. These control variables control for factors that are particular to a PMOS in a given year. These particular factors could be retention rate, slower promotions, or many other factors specific to PMOS or fiscal year.

5. Occupational Field Groupings

A series of regressions is performed for select occupational field groupings. Differences among the occupational fields are highlighted in the analysis. The three occupational groupings are Infantry, Technical, and Non-Technical. Programs enlisted for (PEF) codes are used to distinguish Technical and Non-Technical occupational field groupings. A listing of the occupational field groupings is included as Appendix A. Interaction variables are created between Technical and Non-Technical occupational fields and the set of standardized quality score components to account for the effect these independent variables have on one another. These interaction terms are included in the regression analysis. The occupational field groupings are detailed in Table 12.

Table 12. Occupational Field Summary and Representation Percentage

Occupational Field Grouping	# of Individuals	% of Total Population
Infantry	13,496	17.3%
Technical	17,931	23.0%
Non-Technical	46,390	59.6%
Total	77,817	100%

6. Model Description

Numerous regression models are used for the data analysis and to answer each research question. The following sub-sections correspond to the three goals outlined in the Regression Overview section.

- Is the tiered evaluation system a valid predictor of future success?

To analyze the tiered evaluation system as a predictor of future success, I evaluate the total population within the data set. If the tiered evaluation system is a valid predictor of future success, the success outcome should be increasingly worse as the tier assigned decreases (higher number of promotion months, shorter career longevity, lower physical fitness level, and lower FitRep averages). Model (1) is designed for this analysis as follows:

$$(1) Y_i = \chi_i \beta + T_{1i} \gamma + \mu_i$$

where:

- Y is one of the nine success outcomes
- X is the set of control variables
- T₁ is the set of four dummy variables indicating tier assignment
- Can value be gained through a modified tier system?

With modified tier system the total population within the data set is again used. Indications the modified tier can add value to the reenlistment process is found by examining the inter-tier coefficient difference within tiers 2a, 2b, 3a, and 3b. A large difference within the sub tiers provides support that a modified tier system may add value in distinguishing quality levels. Additionally, a small difference in the coefficient values between Tiers 1 and 2a or Tiers 3b and 4 indicates that subset of individuals may be more

closely aligned to the quality level in the bordering tier. Observing this effect may also support a modification to the current tiered evaluation system. To evaluate the modified tier, model (2) is designed as follows:

$$(2) Y_i = \chi_i \beta + T_{2i} \gamma + \mu_i$$

where:

- Y is one of the nine success outcomes
- X is the set of control variables
- T₂ is the set of six dummy variables indicating modified tier assignment

Additionally, model 3 is developed to explore differences between Tiers 2 and 3 and to support further analysis on modifying the current tier system in favor of a system with more tiers. To provide support for the modified tier, the inter-tier coefficients should display large variation. To explore the differences between Tiers 2 and 3, model (3) is designed as follows:

$$(3) Y_i = \chi_i \beta + Q_i \gamma + \mu_i$$

where:

- Y is one of the nine success outcomes
- X is the set of control variables
- Q is the standardized quality score

a. Is the quality score weighted correctly? How does it differ among occupational fields?

To evaluate the current weighting of the quality score calculation the entire population and population subsets of occupational field groupings are used. For the occupational field grouping analysis, interaction variables between Technical and Non-Technical occupational fields and the set of standardized quality score component are incorporated. Variations in statistical significance and large differences across the occupational fields indicate a component may be of greater importance in predicting success in one occupational field over another. Differences across occupational fields suggest an adapted model tailored to specific occupational fields may be appropriate. Model (4) is designed to evaluate the current quality score weighting and to examine differences across occupational field. Model (5) is the same model including interactions

with the Technical and Non-Technical occupational field groupings with each quality score component. Models 4 and 5 are designed as follows:

$$(4) Y_i = \chi_i\beta + C_i\gamma + \mu_i$$

where:

- Y is one of the nine success outcomes
- X is the set of control variables
- C is the set of standardized quality score components

$$(5) Y_i = \chi_i\beta + C_i\gamma + D_i\gamma + E_i\gamma + \mu_i$$

where:

- Y is one of the nine success outcomes
- X is the set of control variables
- C is the set of standardized quality score components
- D is the set of control variables for Non-Technical Occupational Field Grouping
- E is the set of control variables for the Technical Occupational Field Grouping

C. SUMMARY

This chapter describes the techniques for the analysis and provides an overview of the goals and four models that guide the research. A standard set of control variables to control for fixed effects are included in all regression models and multiple primary variables are used to evaluate the nine specific success outcomes. Chapter V reports the results from the goals and four models that guide this research.

V. ANALYSIS

A. SUCCESS MEASURES

The success measures analysis uses multiple regressions with different controls and population subsets to analyze each research question across success outcomes.

1. Is the tiered evaluation system a valid predictor of future success?

To answer this question I observe the success outcomes while controlling for tier assignment. Model (1) serves as the foundation for this analysis. The purpose is to determine if the outcomes are increasingly worse as the tier assigned decreases. Table 13 displays the regression output and summary statistics for the model.

Table 13. The Effects of Standard Tier Assignments on the Success Outcomes

Variables	Months to E6	Months to E7	Stay 6	Stay 8	Stay 10	Stay 12	PFT Reent+ 2yrs	ReVal Cumulative	ROCV Cumulative
Tier 2	1.857*** (0.183)	1.089** (0.451)	-0.065*** (0.007)	-0.055*** (0.008)	-0.053*** (0.010)	-0.062*** (0.012)	-11.591*** (0.319)	-1.126*** (0.053)	-0.251*** (0.011)
Tier 3	3.388*** (0.198)	1.925*** (0.491)	-0.177*** (0.007)	-0.164*** (0.008)	-0.179*** (0.009)	-0.179*** (0.012)	-31.839*** (0.327)	-2.326*** (0.054)	-0.528*** (0.011)
Tier 4	4.358*** (0.582)	1.902 (1.576)	-0.278*** (0.012)	-0.260*** (0.015)	-0.298*** (0.018)	-0.275*** (0.024)	-45.189*** (0.800)	-3.132*** (0.132)	-0.690*** (0.029)
Observations	25,249	6,168	51,440	35,081	24,703	14,515	62,664	36,216	37,001
R-squared	0.316	0.330	0.076	0.066	0.069	0.069	0.240	0.108	0.108
The model includes a constant and controls for fiscal year of reenlistment and PMOS. Robust standard errors in parentheses *** p<0.01, **p<0.05, *p<0.1									

a. Promotion Speed

As shown in Table 13, for months to E6, the model predicts an increase in value for each tier when compared to Tier 1 Marines. On average, in reference to Tier 1 Marines, Tier 2 Marines are promoted approximately 1.9 months slower, Tier 3 approximately 3.4 months, and Tier 4 approximately 4.4 months. All values show strong statistical significance ($p < 0.01$). The tiered evaluation system appears to be a valid predictor for promotion speed to E6.

For months to E7, the model predicts an increase in value for each tier when compared to Tier 1 Marines; however, the Tier 4 predicted value is statistically insignificant. Given that only 3.7 percent of the individuals in the data set assigned to Tier 4 were promoted to E7, this may explain the lack of statistical significance for the Tier 4 predicted value. The model predicts on average, in reference to Tier 1 Marines, Tier 2 Marines are take approximately 1.1 months longer to be promoted and Tier 3 approximately 1.9 months longer. The tiered evaluation system seems to be appropriate as a predictor for promotion speed to E7.

Additional analysis determines the percentage of Marines promoting to E6 and E7 relative to tier assignment. The results of the analysis are provided in Table 14. For the entire data set of reenlisted individuals, approximately 37 percent were promoted to E6. Of those, 54 percent of Tier 1 Marines were promoted to E6 compared to 43 percent of Tier 2, 28 percent of Tier 3, and 18 percent of Tier 4 Marines. Approximately 10 percent of the Marines in the data set were promoted to E7. Of those, 17 percent of Tier 1 Marines were promoted to E7 compared to 12 percent of Tier 2, 7 percent of Tier 3, and 4 percent of Tier 4.

Table 14. Promotions by Tier Assignment

Tier	Total	E6	E6 Percent	E7	E7 Percent
1	11,577	6,235	53.9%	1,928	16.7%
2	28,743	12,253	42.6%	3,531	12.3%
3	34,393	9,767	28.4%	2,333	6.8%
4	3,104	546	17.6%	116	3.7%
Total	77,817	28,801	37.0%	7,908	10.2%

Recognizing that Marines assigned to Tier 1 have a greater percentage that were already E5 at the time of reenlistment is a factor to consider when conducting this analysis. To account for the potential time bias, time in service promotion targets are incorporated in the analysis. Instead of using the time in service promotion target alone, the time in service promotion target is added to the Marine's first reenlistment date. Provided a Marine should normally have 3 years' time in service at first reenlistment, this measure allows a more conservative approach instead of strictly applying the promotion

targets alone. Figures 3 and 4 provide the details of tier assignment promotion percentages for years that meet the time in service promotion target criteria.

Figure 3. E6 Promotion Percentages by Reenlistment Fiscal Year and Tier Assignment

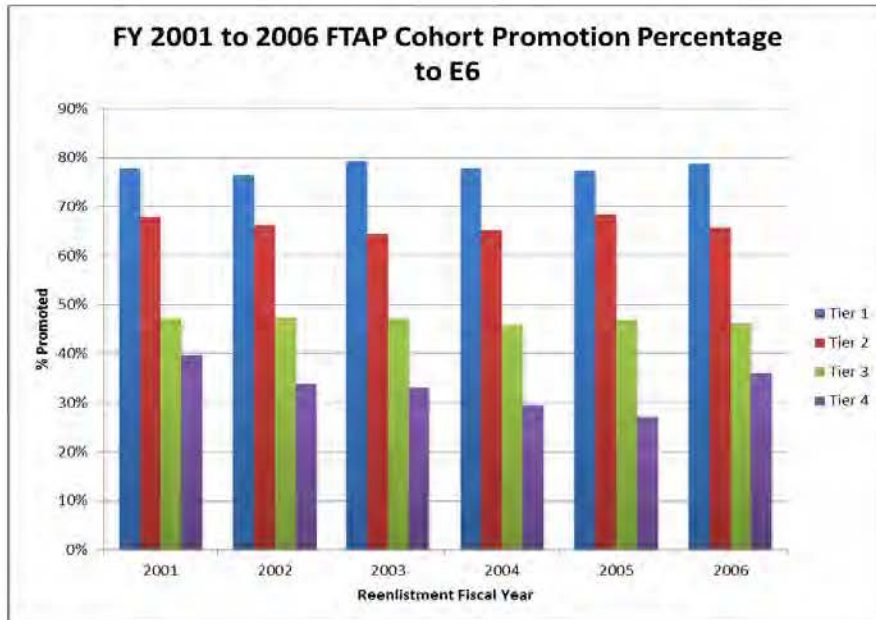
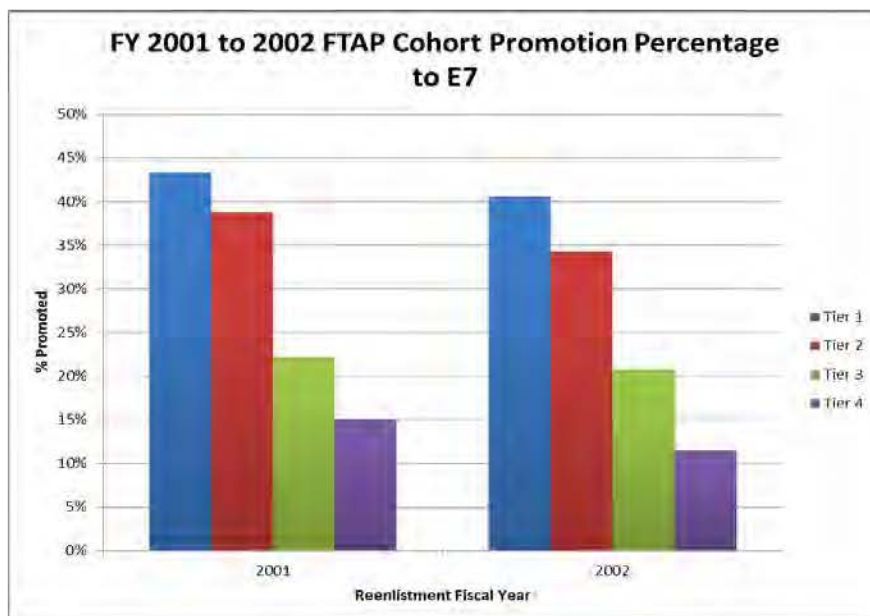


Figure 4. E7 Promotion Percentages by Reenlistment Fiscal Year and Tier Assignment



b. Career Longevity

As shown in Table 13, for serving six years beyond first reenlistment, the model predicts on average, compared to Tier 1 Marines, Tier 2 Marines have a 6.5 percentage point lower probability of staying to six years beyond first reenlistment, Tier 3 Marines have a 17.5 percentage point lower probability, and Tier 4 Marines have a 27.5 percentage point lower probability. All values show strong statistical significance ($p < 0.01$). The lower probabilities as the tier assigned decreases can be expected because of the “up or out” mentality enforced with service limitations. Individuals that are of higher quality inherently have more opportunity to advance and therefore have the option to stay longer. In individual cases however this may be a surprise as the opportunities that exist outside the military service for higher quality individuals may also serve as an incentive for them to exit military service without retiring or being forced out.

For serving eight year, ten and twelve years beyond their first reenlistment, the model predicts on average, a lower probability of staying as the tier assigned decreases. When compared to the previous measurement at six years the eight-year values all represent a slight increase of approximately one percentage point. The predicted value at ten years for Tier 4 shows a significant decrease of four percentage points, which can be explained by more low quality individuals leaving the service. These exits are likely contributed to service limitations, denials of reenlistment, voluntary exits or various other reasons. Interestingly, the predicted values at the twelve-year benchmark are within a half a percentage point of the values at the original six-year benchmark. The tiered evaluation system seems to be an appropriate predictor for those serving to each specific time benchmark beyond their first reenlistment point.

Additional analysis examines time benchmarks from 8 to 16 years’ time in service. The results are shown in Table 15 and Figure 5. This analysis includes only individuals that reenlisted at their first reenlistment point. The results show a small difference among the various tiers at 8 years’ time in service. However, the results at 16 years’ time in service reveal a significant decrease in time served across the quality tiers. More specifically, on average Tier 1 Marines are almost 2.5 times more likely to serve 16 years or beyond than Tier 4 Marines. This can be a significant driver of higher personnel

costs. Similar to previous analysis, this data is censored by time. To account for time censored data, the fiscal year 2001 FTAP cohort is graphically displayed in Figure 6, which includes only individuals reenlisting for the first time in fiscal year 2001.

Table 15. Percentage of Individuals by Tier Assignment Meeting Time in Service Benchmarks

Tier	Reenlisted	% of Tier Reenlisted	8	10	12	14	16
1	11,557	37.0%	67.7%	41.2%	26.8%	16.1%	8.4%
2	28,740	29.9%	65.9%	37.4%	24.2%	14.5%	7.6%
3	34,393	21.8%	63.9%	31.0%	19.4%	10.7%	5.6%
4	3,127	9.6%	58.5%	24.9%	15.2%	7.1%	3.7%

Figure 5. Percentage of Individuals by Tier Assignment Meeting Time in Service Benchmarks

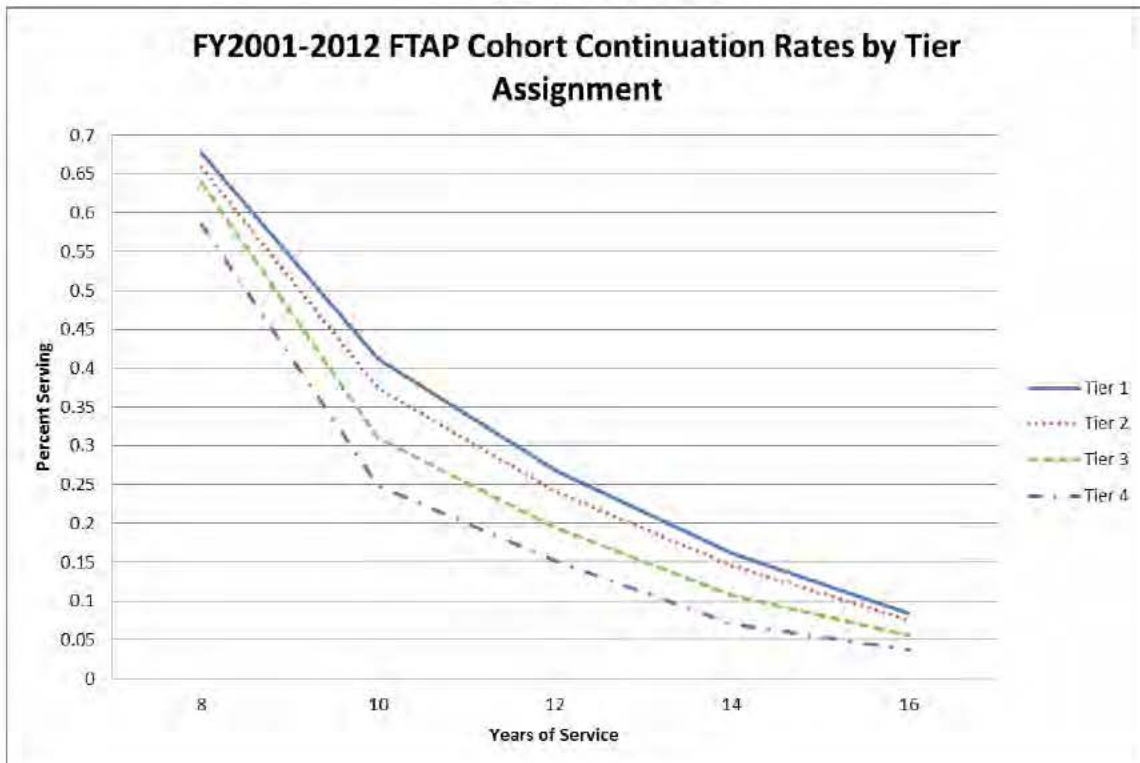
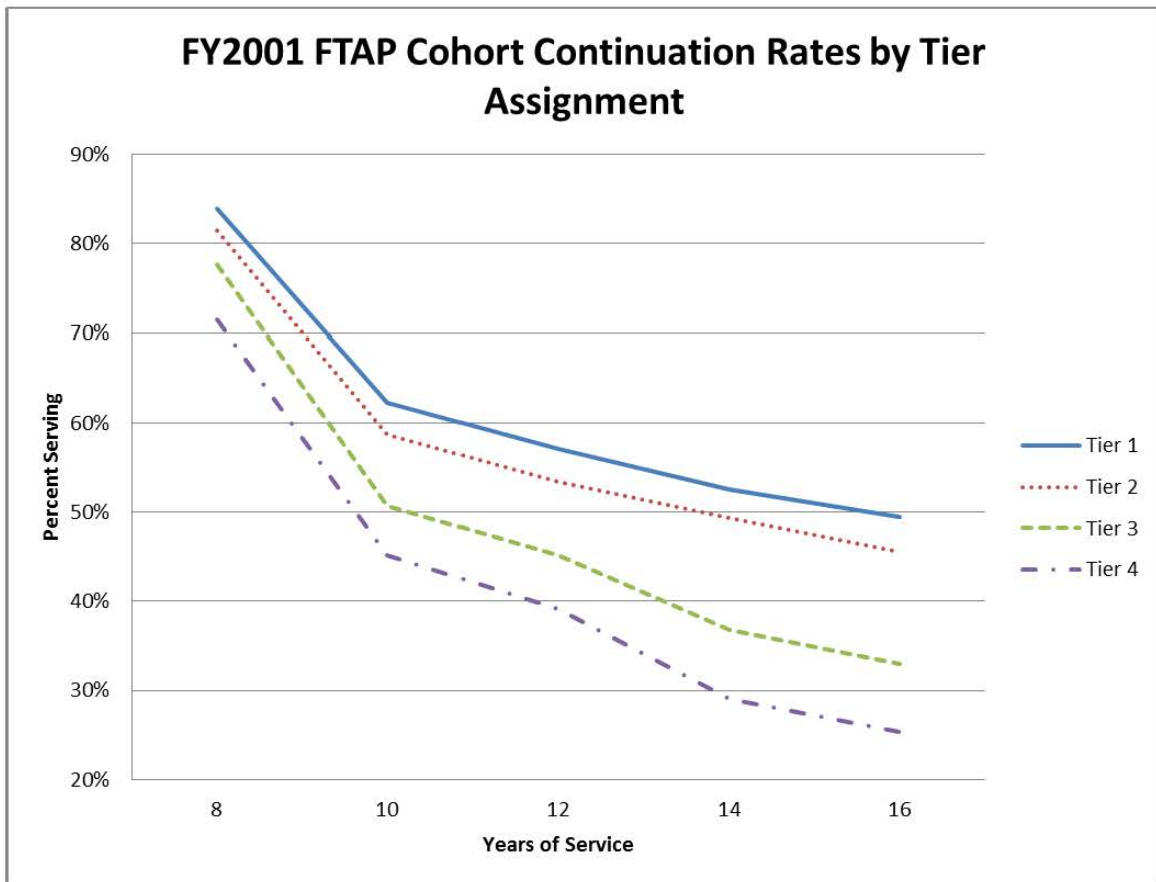


Figure 6. FY2001 FTAP Cohort Continuation Rates by Tier Assignment



The results of the career longevity analysis can be explained by many factors. The most likely causes are due to proper person-job fit and possibly more importantly person-organization fit. Additionally, Marines identified in higher quality tiers may have greater ability that contributes to their success within the organization and their particular occupational specialty.

Time in service may be limited by the individual or the service. For high-quality Marines, the organization inherently benefits from their continued service. The implementation of the early reenlistment submission provided for Tier 1 Marines represents that these high quality Marines hold a distinct amount of power in the person-organization relationship. An individual identified as lower quality shifts much of this control back to the organization at each reenlistment point and is often found employed at the will of the organization.

c. *Physical Fitness Level*

As shown in Table 13, for the PFT at Reenlistment + 2 years, the model predicts on average, compared to Tier 1 Marines, Tier 2 Marines have a 12 point lower score compared to 32 points lower for Tier 3 and 45 points lower for Tier 4. All values show strong statistical significance ($p < 0.01$). Given that one standard deviation is 33 points, these differences across the tier assignments are practically significant.

d. *Performance Evaluation Averages*

As shown in Table 13, for both the RSRV cumulative average and the ROCV average, the model predicts on average a lower value as the tier assigned decreases. Given standard deviations of 3.7 and 0.8 shown in Table 10, the predicted values in the model for Tier 4 of 3.1 and 0.7 respectively have strong practical significance. The tiered evaluation system seems to be an appropriate predictor for both FitRep averages.

2. Can value be gained through a modified tier system?

This question is addressed by observing the success outcomes when controlling for modified tier assignment. The analysis is continued by repeating the regressions and focusing on only those individuals assigned to Tiers 2 and 3. The purpose is to observe intra-tier variation and determine if a modified tier system would better distinguish quality. Models (2) and (3) are used for this analysis. Tables 16 and 17 contain the regression output for this analysis. Tables 18 and 19 display the percentage of total deviation between Tiers 1 and 4 that occurs within each tier under the current and modified tier. The percent variation assigned to each tier is calculated by taking the difference in coefficient between the tier of interest and the previous tier and dividing by the coefficient for Tier 4. These percentages allow for easy identification of tiers where the variation is irregular.

Table 16. The Effects of Modified Tier Assignments on the Success Outcomes

Variables	Months to E6	Months to E7	Stay 6	Stay 8	Stay 10	Stay 12	PFT Reenl+ 2yrs	RelVal Cumulative	ROCV Cumulative
Tier 2a	1.369*** (0.205)	0.772 (0.497)	-0.052*** (0.007)	-0.040*** (0.009)	-0.034*** (0.011)	-0.042*** (0.014)	-7.167*** (0.356)	-0.826*** (0.059)	-0.187*** (0.012)
Tier 2b	2.514*** (0.225)	1.509*** (0.568)	-0.079*** (0.008)	-0.070*** (0.009)	-0.074*** (0.011)	-0.087*** (0.014)	-16.561*** (0.378)	-1.462*** (0.062)	-0.323*** (0.013)
Tier 3a	3.212*** (0.218)	1.844*** (0.543)	-0.141*** (0.007)	-0.127*** (0.009)	-0.139*** (0.010)	-0.142*** (0.013)	-27.118*** (0.358)	-2.042*** (0.059)	-0.455*** (0.013)
Tier 3b	3.661*** (0.270)	2.122*** (0.672)	-0.223*** (0.007)	-0.211*** (0.009)	-0.234*** (0.011)	-0.229*** (0.014)	-38.154*** (0.406)	-2.737*** (0.067)	-0.632*** (0.015)
Tier 4a	4.479*** (0.573)	2.276 (1.502)	-0.274*** (0.012)	-0.255*** (0.015)	-0.288*** (0.018)	-0.259*** (0.023)	-44.816*** (0.788)	-3.127*** (0.130)	-0.689*** (0.029)
Observations	25,249	6,168	51,440	35,081	24,703	14,515	62,664	36,216	37,001
R-squared	0.317	0.330	0.079	0.069	0.073	0.073	0.258	0.114	0.115
The model includes a constant and controls for fiscal year of reenlistment and PMOS. Robust standard errors in parentheses *** p<0.01, **p<0.05, *p<0.1									

Table 17. The Effects of Tier Assignments on the Success Outcomes for Tier 2 and Tier 3 Assignments

Variables	Months to E6	Months to E7	Stay 6	Stay 8	Stay 10	Stay 12	PFT Reenl+ 2yrs	RelVal Cumulative	ROCV Cumulative
Tier 2									
Quality Score	-4.038*** (0.758)	-5.317*** (1.824)	0.104*** (0.025)	0.097*** (0.030)	0.141*** (0.036)	0.127*** (0.047)	31.576*** (1.198)	2.299*** (0.204)	0.509*** (0.045)
Observations	10,816	2,767	18,730	13,005	9,215	5,369	23,643	14,118	14,373
R-squared	0.366	0.423	0.095	0.097	0.094	0.101	0.160	0.106	0.106
Tier 3									
Quality Score	-0.498 (0.703)	-1.112 (1.645)	0.190*** (0.016)	0.200*** (0.018)	0.260*** (0.023)	0.220*** (0.028)	16.442*** (0.831)	1.390*** (0.143)	0.326*** (0.031)
Observations	8,409	1,787	23,163	15,446	10,884	6,459	27,132	15,140	15,565
R-squared	0.371	0.486	0.095	0.090	0.089	0.090	0.174	0.106	0.098
The model includes a constant and controls for fiscal year of reenlistment and PMOS. Robust standard errors in parentheses *** p<0.01, **p<0.05, *p<0.1									

Table 18. Percent of Total Variation by Tier

Variables	Months to E6	Months to E7	Stay 6	Stay 8	Stay 10	Stay 12	PFT Reent+ 2yrs	RelVal Cumulative	ROCV Cumulative
Tier 2	42.6%	57.3%	23.4%	21.2%	17.8%	22.5%	25.7%	36.0%	36.4%
Tier 3	35.1%	44.0%	40.3%	41.9%	42.3%	42.5%	44.8%	38.3%	40.1%
Tier 4	22.3%	-1.2%	36.3%	36.9%	39.9%	34.9%	29.5%	25.7%	23.5%
Observations	25,249	6,168	51,440	35,081	24,703	14,515	67,769	36,216	37,001
R-squared	0.316	0.330	0.076	0.066	0.069	0.069	0.137	0.108	0.108

Table 19. Percent of Total Variation by Modified Tier

Variables	Months to E6	Months to E7	Stay 6	Stay 8	Stay 10	Stay 12	PFT Reent+ 2yrs	RelVal Cumulative	ROCV Cumulative
Tier 2a	30.6%	33.9%	19.0%	15.7%	11.8%	16.2%	16.0%	26.4%	27.1%
Tier 2b	25.6%	32.4%	9.9%	11.8%	13.9%	17.4%	21.0%	20.3%	19.7%
Tier 3a	15.6%	14.7%	22.6%	22.4%	22.6%	21.2%	23.6%	18.5%	19.2%
Tier 3b	10.0%	12.2%	29.9%	32.9%	33.0%	33.6%	24.6%	22.2%	25.7%
Tier 4	18.3%	6.8%	18.6%	17.3%	18.8%	11.6%	14.9%	12.5%	8.3%
Observations	25,249	6,168	51,440	35,081	24,703	14,515	67,769	36,216	37,001

e. Promotion Speed

As presented in Table 19, the most notable difference between tiers in the regression output is between Tiers 1 and 2a. The difference between Tier 1 and 2a account for 31% of the total variance between Tiers 1 and 4 for months to E6 in the modified tier model. Likewise, Tiers 1 and 2a account for 34% of the total variance between Tiers 1 and 4 for months to E7. Tiers 2a and 2b account for more than half the total variance predicted in the model. Given that Tiers 2a and 2b are combined into one tier in the current tiered evaluation system, this difference supports a modified tier system encompassing more quality tiers.

When using population subsets of only individuals assigned to Tiers 2 and 3 the predicted value for months to E6 and E7 for Tier 3 is not statistically significant whereas

the predicted values for the Tier 2 population shows strong statistical significance ($p < 0.01$). As seen in Table 17, the predicted effect quality score has on the corresponding months to E7 is greater in magnitude than the predicted corresponding effect on months to E6. This is expected given the average time to E7 is 4 months greater than the average months to E6 for individuals in the data set.

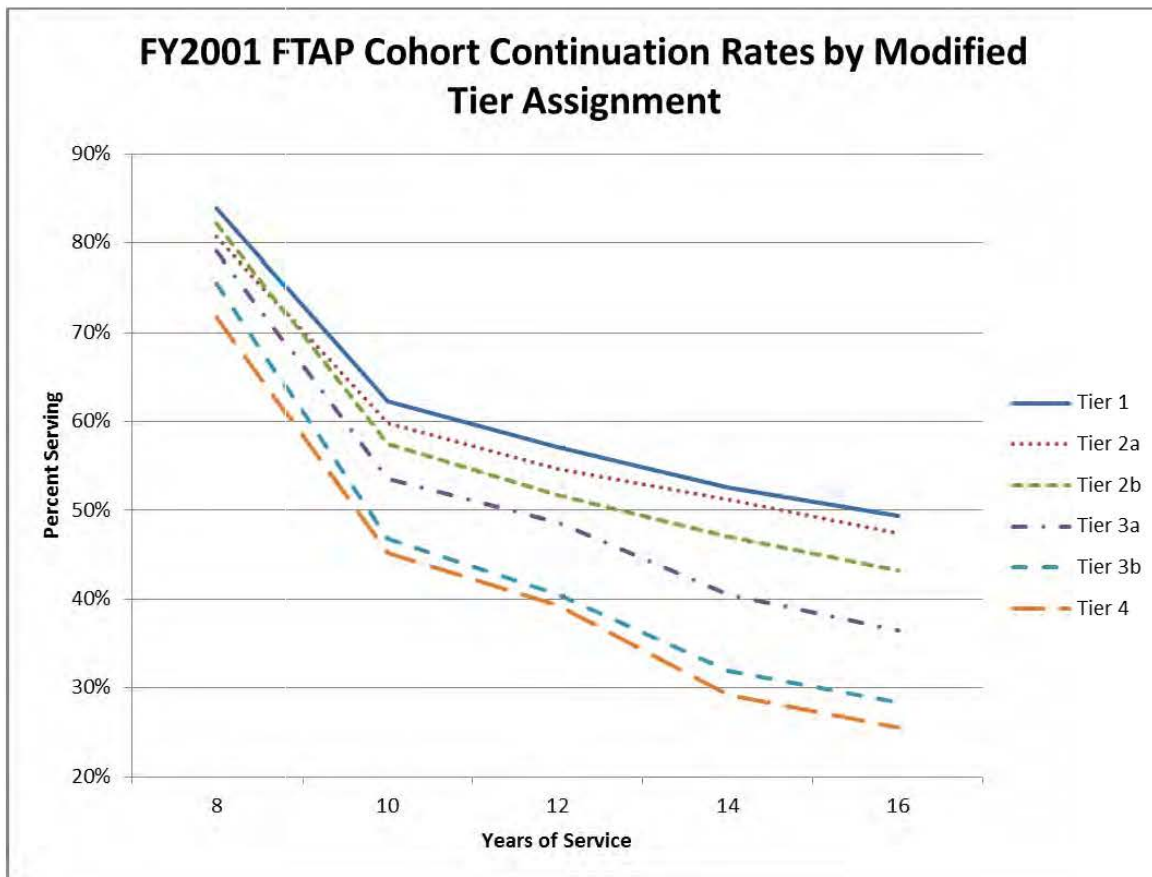
f. Career Longevity

As shown in Table 19, the largest difference in the modified tier occurs within Tiers 3a and 3b. Tiers 3a and 3b account for approximately 55 percent of the total variation between Tiers 1 and 4 for all longevity benchmarks. The percentage point difference is approximately 8.5 between Tiers 3a and 3b compared to a difference of approximately 10 percentage points in the original tier between Tiers 3 and 4. This large variation represents a large variation in quality within Tier 3 and supports a modified tier system comprised of more tiers.

As presented in Table 17, when using population subsets of individuals assigned to Tiers 2 and 3, the model predicts a one standard deviation increase in quality score corresponds to a greater percentage point increase in probability of staying for Tier 3 individuals than Tier 2 individuals. This is likely due to the relatively small difference in the longevity outcomes of Tier 1 and 2 individuals when compared to the gap that exists between Tier 2 and 3 individuals. This difference suggests a one deviation increase for an individual Marine of lower quality may have a greater relative impact on his career longevity than an individual of higher quality. This variation is statistically and practically significant and provides support for a modified tier system.

In order to further the analysis between the current tier system and a modified tier, the fiscal year 2001 FTAP cohort is graphically depicted in Figure 7 using the modified tier system. Under the modified tier, the large gap previously seen between Tiers 2 and 3 is more evenly divided.

Figure 7. FY2001 FTAP Cohort Continuation Rates by Modified Tier Assignment



g. *PFT Reenl + 2 years*

As shown in Tables 18 and 19, the largest difference in the modified tier from the original model is observed between Tiers 3b and 4. These two tiers alone combine for 40 percent of total variation predicted in the model. This large variation within these sub-tiers provides support for a modified tier system.

As shown in Table 17 and when using population subsets of individuals assigned to Tiers 2 and 3, the model predicts a one standard deviation increase in quality score corresponds to an increase in PFT score at Reenl + 2 years of 32 points for Tier 2 individuals and 16 points for Tier 3 individuals..

h. Performance Evaluation Averages

For both the RSRV cumulative average and the ROCV average, the greatest amount of inter-tier variance occurs between Tiers 1 and 2a. As shown in Table 19, the variance between Tiers 1 and 2a for the RSRV cumulative and ROCV accounts for 26 and 27 percent of the total variation between Tiers 1 and 4. This large variance is despite the relatively small size of these tiers. The difference between Tiers 3a and 3b also appears large which, supports that quality can be better distinguished by implementing a system with more tiers.

When using population subsets of individuals assigned to Tiers 2 and 3 the model predicts a larger corresponding effect for those individuals assigned to Tier 2. As shown in Table 17, the difference in predicted values between Tiers 2 and 3 for both the RSRV and ROCV average are relatively small; however, they both represent about a quarter standard deviation for their respective values. The difference between Tiers 2 and 3 is both statistically and practically significant.

2. Is the quality score weighted correctly?

This question is addressed by observing the success outcomes when controlling for standardized quality score components. The purpose is to determine if some components are more relevant for predicting successful outcomes. Tables 20 and 21 contain the regression output and summary statistics for this analysis. Model (4) is used for this analysis.

Table 20. The Effects of Standardized Quality Score Components on the Success Outcomes

Variables	Months to E6	Months to E7	Stay 6	Stay 8	Stay 10	Stay 12	PFT Reenl+ 2yrs	RelVal Cumulative	ROCV Cumulative
PFT Score	-0.473*** (0.089)	-0.221 (0.197)	0.047*** (0.002)	0.049*** (0.003)	0.058*** (0.003)	0.054*** (0.004)	15.667*** (0.234)	0.341*** (0.022)	0.096*** (0.005)
Rifle	-0.304** (0.140)	-0.247 (0.410)	0.016*** (0.004)	0.019*** (0.005)	0.025*** (0.007)	0.021** (0.009)	0.424** (0.188)	0.133*** (0.039)	0.033*** (0.008)
Proficiency	-0.746*** (0.150)	-0.805** (0.335)	0.012*** (0.004)	0.006 (0.005)	0.011** (0.006)	0.011 (0.007)	3.421*** (0.238)	0.830*** (0.041)	0.164*** (0.009)
Conduct	-0.659*** (0.147)	0.053 (0.335)	0.034*** (0.004)	0.038*** (0.005)	0.037*** (0.005)	0.035*** (0.007)	0.391* (0.231)	0.229*** (0.039)	0.052*** (0.009)
Merit. Prom.	-0.389*** (0.065)	-0.330** (0.146)	0.011*** (0.002)	0.010*** (0.003)	0.012*** (0.003)	0.015*** (0.004)	1.666*** (0.108)	0.240*** (0.019)	0.050*** (0.004)
Observations	25,249	6,168	51,440	35,081	24,703	14,515	62,662	36,214	36,999
R-squared	0.319	0.331	0.075	0.068	0.075	0.075	0.321	0.137	0.131
The model includes a constant and controls for fiscal year of reenlistment and PMOS. Robust standard errors in parentheses *** p<0.01, **p<0.05, *p<0.1									

Table 21. Summary Statistics for Quality Score Components

Variable	Obs	Mean	Std. Dev.	Min	Max
PFT Score	77,817	243.1	40.7	0	300
Rifle	77,817	231.9	47.5	0	345
Proficiency	77,817	442.7	13.1	210	490
Conduct	77,817	441.8	14.6	150	490
Merit. Prom	77,817	10.6	30.7	0	100

a. Promotion Speed

As presented in Table 20, the model predicts the variable with the most corresponding effect for both months to E6 and months to E7 is proficiency marking. The model predicts a one standard deviation increase in proficiency marks decreases months to E6 by 0.7 months and months to E7 by 0.8 months. For months to E6, the impact each component has from greatest to least is proficiency marking, conduct marking, PFT score, meritorious promotion and rifle score. Since proficiency and conduct markings, carry the most weight in the current quality score calculation, this finding provides some support for the current quality score weighting. With the exception of proficiency

marking and meritorious promotion, for months to E7, all other predicted values are deemed not statistically significant.

b. Career Longevity

As shown in Table 20, the model predicts the variables with the most corresponding influence with career longevity at the various time benchmarks are PFT score and conduct marking. Conduct marking is expected to be correlated with longevity because a low conduct marking may represent legal issues and/or behavior that is incompatible with Marine standards. These behaviors may result in the individual being found unfit for further service and or separation against the will of the individual, which would explain the longevity difference associated with conduct. Additionally, PFT score carries a significant amount of weight in the quality score calculation but only 60 percent of the total weight relative to conduct marking. Since PFT score can also be a great indicator of individual motivation, dedication, and overall compatibility in a physically demanding organization, its corresponding significance on longevity is little surprise. Overall, insufficient evidence exists that the quality score is adequately weighted to predict career longevity.

c. Performance Evaluation Averages

As displayed in Table 20, the most significant predicted value for both RSRV cumulative average and the ROCV average is the proficiency marking. A one standard deviation change or a 0.13 point increase in the proficiency marking is predicted to increase the RSRV cumulative average by 0.83 points. A one standard deviation change or a 0.13 point increase in the proficiency marking is predicted to increase the ROCV cumulative average 0.16 points. Both of these values are statistically and practically significant. Considering FitRep's take the place of proficiency and conduct marks as the performance evaluation standard for pay grades E5 and above, the correlation between these two variables is expected. Since proficiency marking along with conduct marking carry the most weight in the current quality score calculation, this finding appears to provide evidence proficiency marking is weighted appropriately. PFT score is predicted to have the second most significant corresponding effect on FitRep averages. Given PFT only carries 60 percent of the total potential weight of

proficiency and conduct marking, insufficient evidence exists that the current quality score is accurately weighted regarding PFT score.

Overall, proficiency marking, conduct marking, and physical fitness test appear to be the most significant values across the success measures. Given that the PFT and CFT combine for 600 points in the quality score calculation, physical fitness is the most heavily weighted item in the current quality score calculation. CFT was not used in this specific analysis because of the limited number of years of data available since scoring officially began in 2010. For the quality score components evaluated, rifle score appears to be the least relevant measure in predicting future success. Rifle score comprises 16 percent of the total points in the quality score calculation yet it has very little significance in predicting future success. Even though, MCMAP belt points is not part of this analysis because it did not extend the duration of the data set, it is a relatively useless component at the current point assignment values. According to MCO 1500.59, Black Belt 3rd Degree requires a minimum rank of Staff Sergeant. Given the likelihood that an individual achieves the rank of Staff Sergeant prior to the tier placement is virtually, if not practically impossible, the max number of points an individual can receive under the current system is 30 points. This represents slightly more than 1 percent of the overall total possible points for the quality score computation.

- How do the quality score components differ across occupational fields?

This question is addressed by examining the statistical significance and variation in the coefficient estimates for the quality score components across three success measures, which include months to E6, Stay 8, and RSRV cumulative average. Large differences across the occupational fields indicate a component may be of greater importance in one occupational field. Differences across occupational fields suggest an adapted model tailored to specific occupational field groupings may be appropriate. Interactions are created for the Technical and Non-Technical occupational field groupings with the quality score components to account for the effect these independent variables have on one another. Model (5) is used in this analysis. Regression output and summary statistics are provided in Tables 22 and 23. Technical and Non-Technical are denoted by a “T” and “NT” in the variables column of Table 22.

Table 22. The Effects of Standardized Quality Score Components on the Success Outcomes by Occupational Field

Variables	Months to E6	Stay 8	RS ReVal Cumulative
Infantry Estimates			
PFT Score	-0.986***	0.053***	0.323***
	(0.376)	(0.008)	(0.065)
Rifle	0.400	0.017	0.125
	(0.415)	(0.011)	(0.113)
Proficiency	-0.999**	0.008	0.914***
	(0.500)	(0.013)	(0.107)
Conduct	0.106	0.030***	-0.067
	(0.444)	(0.012)	(0.105)
Merit. Prom.	-0.700***	0.017**	0.285***
	(0.202)	(0.007)	(0.046)
Non-Technical Interactions Estimates			
PFT Score x NT	0.583	-0.004	0.003
	(0.390)	(0.008)	(0.070)
Rifle x NT	-0.836*	-0.001	0.042
	(0.449)	(0.012)	(0.125)
Proficiency x NT	0.401	-0.001	-0.086
	(0.531)	(0.014)	(0.119)
Conduct x NT	-0.886*	0.004	0.307***
	(0.479)	(0.013)	(0.116)
Merit. Prom. x NT	0.371*	-0.007	-0.060
	(0.216)	(0.007)	(0.052)
Technical Interactions Estimates			
PFT Score x T	0.573	-0.008	0.053
	(0.411)	(0.010)	(0.077)
Rifle x T	-0.880*	0.009	-0.065
	(0.500)	(0.015)	(0.130)
Proficiency x T	-0.067	-0.010	-0.121
	(0.587)	(0.017)	(0.133)
Conduct x T	-1.061**	0.031*	0.498***
	(0.533)	(0.016)	(0.129)
Merit. Prom. x T	0.380	-0.008	-0.040
	(0.237)	(0.009)	(0.059)
p-value for Test of Joint Significance of Non-Technical Interactions	0.019	0.914	0.037
p-value for Test of Joint Significance of Technical Interactions	0.001	0.145	0.000
Observations	25,249	35,081	36,214
R-squared	0.320	0.069	0.138
The model includes a constant and controls for fiscal year of reenlistment and PMOS. Robust standard errors in parentheses *** p<0.01, **p<0.05, *p<0.1 T=Technical Occupational Field Grouping NT=Non-Technical Occupational Field Grouping			

Table 23. Summary Statistics for Occupational Field Groupings

Variable	Obs	Mean	Std. Dev.	Min	Max
Infantry Occupational Field Grouping					
Month to E6	4,083	51.294	13.902	10.023	141.01
Stay 8	13,496	0.199	0.399	0	1
Avg RelVal Cumulative	5,911	90.082	3.727	80	100
Non-Technical Occupational Field Grouping					
Month to E6	17,562	49.053	12.877	7.98554	151.10
Stay 8	46,390	0.251	0.434	0	1
Avg RelVal Cumulative	21,835	89.870	3.772	80	100
Technical Occupational Field Grouping					
Month to E6	7,156	48.017	12.570	16.03681	118.04
Stay 8	17,931	0.225	0.418	0	1
Avg RelVal Cumulative	8,470	89.904	3.509	80	100

This analysis reveals very few similarities in the coefficient estimates across occupational fields. Rifle score appears the least statistically significant measure throughout this analysis. Oddly, rifle score appears even less significant within the Infantry occupational field when compared to the other fields. Conduct markings appear to more significant within the Technical and Non-Technical fields relative to Infantry. PFT score appears to be more important as a predictor of future success within the Infantry occupational field. For both months to E6 and the RS RelVal, a joint significance test on the variables interacted with Non-Technical and Technical reveals the overall variation across the categories is jointly significant. However, for the career longevity benchmark, a joint significance test on the variables interacted with Non-Technical and Technical reveals the overall variation across the categories is not jointly significant. Given these results, sufficient evidence exists to conclude scoring components may be of greater importance in one occupational field over another.

B. ADDITIONAL ANALYSIS

Additional analysis compiles the number of adverse FitRep's occurring over the 6 year period after the first reenlistment. Table 26 lists the percentage of Marines by quality tier with an Adverse FitRep. In order to establish an unbiased basis, this analysis was

conducted only on those serving at least 10 years of service. The percentage of Adverse FitRep's increases as the tier increases, which serves as validation the tiered evaluation system is distinguishing quality.

Table 24. Adverse FitRep Percentages by Tier Assignment for Those Serving at least 10 Years' Time In Service.

Tier	% with Adverse Fitrep	% Serving at least 10 years with Adverse FitRep
1	7.3%	5.9%
2	8.9%	6.8%
3	10.5%	8.1%
4	10.4%	9.3%

C. SUMMARY

The Tiered Evaluation System seems to be sufficiently distinguishing individual quality among the majority of success measures. The analysis observes promotion speed, career longevity, and FitRep averages decrease as the tier assigned decreases. Additionally, the number of adverse FitRep's increases as the tier assigned decreases. These factors are indicators of higher personnel costs due to inefficiency, turnover, and administrative burden.

Sufficient evidence exists that suggests a modified tier system would serve as a better selection tool for quality. The analysis on differences within Tiers 2 and 3 show such large variation that a system with more tiers to segregate quality could help stakeholders in the retention process make better informed organizational decisions.

VI. CONCLUSION, RECOMMENDATIONS, AND SUMMARY

A. INTRODUCTION

This research seeks to answer the primary question of how well the tiered evaluation system predicts future success in terms of promotion speed, career longevity, physical fitness level, and performance evaluations. Furthermore, the research seeks to determine if a modified tier system can serve as a better predictor of success? Secondary questions evaluated include: (1) Is the quality score weighted correctly? and (2) Should all occupational fields have the same weight for the quality score components? The analysis observes first term re-enlistees from each quality tier after their reenlistment to observe promotion speed, physical fitness level, career longevity, and fitness report averages.

B. CONCLUSION

Each research question is addressed based on the analysis in Chapter V.

Is the tiered evaluation system a valid predictor of future success? The tiered evaluation system adequately distinguishes quality across all observed success measures. Specifically, as the tier assigned decreases, the outcome is less desirable. The magnitude of the quality difference is more significant for some success measures over others. For example, the corresponding effect tier assignment has relative to promotion months to E6 is greater than months to E7.

Can value be gained through a modified tier system? A modified tier system comprising six tiers provides greater segregation of quality within the larger tier groups, namely Tiers 2 and 3. For example, evaluating months to E6 revealed more than half of the total variation between Tiers 1 and 4 occurred between Tiers 1 and 2. This represents the individuals assigned to Tier 2 are significantly different in quality level. The large amount of variation within Tiers 2 and 3 was separated into smaller groups that reflect a smaller amount of quality variation providing a better quality match of individuals within each tier.

Is the quality score weighted correctly? With the exception of MCMAP belt level and rifle score, the quality score appears to be adequately weighted. Physical fitness level has one of the largest corresponding effects on the success measures. The PFT and CFT scores, both measures of physical fitness, currently make up the largest weight in the quality score calculation. Rifle score is shown to have little corresponding effect on the success measures. Despite the little corresponding effect rifle score appears to have on the future success measures, rifle score comprises 16 percent of the total possible points in the quality score calculation. MCMAP belt points is limited by minimum rank requirements that makes it extremely unlikely a first term Marine can score higher than 30 points, which is slightly more than 1 percent of the overall total possible points for the quality score computation.

How do the quality score components differ across occupational fields? The quality score components show significant differences across the three occupational field groupings. Joint significance tests, on interacted variables reveals statistically significant differences for promotion speed and performance evaluation averages but not for career longevity. Although little consistency was found that establishes relative importance of a given quality score component in one occupational field over another, the results are still interesting. For example, rifle score appears to be the least significance as a predictor of future success within the infantry occupational field grouping when compared to other fields.

C. STUDY RECOMMENDATIONS

The Marine Corps should develop incentives to target individuals identified as high quality by the Marine Corps Tiered Evaluation System. Currently, other than priority processing given to Tier 1 Marines prior to the reenlistment fiscal year beginning, no reenlistment incentive exists exclusively for Marines identified as high quality. Tailoring reenlistment bonuses to target higher quality Marines is one such way that may prove effective in retaining a greater proportion of high quality individuals. Targeting higher quality individuals in the retention process will contribute to a higher quality career force.

The Marine Corps should implement a modified tier system encompassing more tiers to better distinguish quality among FTAP reenlistment cohorts. Specifically, Tiers 2 and 3 in the current tiered evaluation system comprise 30 and 50 percent of a total FTAP reenlistment cohort. The quality difference between individuals within each of these large tiers is substantial across many of the success measures. Massing individuals into such large groups when attempting to delineate quality differences, adds little value to the enlisted career force objective of providing the most qualified force. A modified system of 6 to 10 tiers would provide greater segregation of quality within the tiers and provide additional value to the stakeholders in the reenlistment process.

MCMAP belt level should be re-evaluated to determine the relative importance the Marine Corps should place on MCMAP belt level when assessing individual quality in first term Marines. At the current point assignment values, including MCMAP belt level in the quality score calculation has no practical value. MCMAP belt level, like physical fitness can serve as an indicator for many other important measures such as dedication, motivation, and overall compatibility as a Marine and therefore the weight it holds in the quality score calculation should reflect its actual importance as a measure of quality. Rifle score has shown to have little corresponding effect on future success as a Marine and the weight it bears in the quality score calculation should be reduced. Despite the relative nominal corresponding effect on future success, marksmanship is a key element of effectiveness for the Marine Corps. Therefore, the importance of marksmanship in the Marine profession should be incentivized utilizing other means to offset any potential diminished effect caused by reducing the weight in the quality score calculation.

A projected quality tier placement should be used by career planners when conducting first term interviews 26 to 24 months prior to a Marines end of current contract (ECC). Furthermore, Marine leadership should emphasize the quality tier placement during periodic counseling and when assisting a junior Marine set individual goals. This emphasis should provide an individual Marine a basis to seek self-improvement prior to the official tier assignment. The tiered evaluation system should

already be a tool used by career planners at the EAS interview conducted between 8 and 6 months of the ECC.

D. RECOMMENDATIONS FOR FUTURE RESEARCH

Additional research should be conducted on individual's reasons for leaving the Marine Corps. Looking at separation codes resident within the TFDW would provide indication of how separations differ across the various quality tiers. Although, this will provide little additional information on the majority of individuals that separate for normal reasons at the completion of their required service, those separating for other reasons can help determine the impact of retaining individuals of various quality levels.

Furthermore, additional research should analyze the current policies that reward individuals that submit for reenlistment early in the fiscal year regardless of quality tier. The "first-come-first-served" practices should be evaluated to determine if priority processing should be expanded beyond just those individuals assigned to Tier 1. The analysis should start by comparing submission rates versus reenlistment rate by month of ECC. Phasing eligible individuals by quality tier throughout the fiscal year may improve the overall quality of the career force by reducing the amount of low quality individuals applying for reenlistment early in the fiscal year and filling a boat space that a higher quality individual may have potentially filled.

E. SUMMARY

The Marine Corps is a pyramid shaped organization; therefore, the Corps will likely always have to send Marines out of the service against their individual will. Despite these force shaping measures that must occur, the Marine Corps can still benefit from increasing the quality of individuals within the eligible reenlistment pool. Quality in first-term Marines is distinguished utilizing the Marine Corps Tiered Evaluation System. This system is valid at distinguishing quality but can be improved in many ways to better distinguish individual quality and aid the decision makers in the reenlistment process.

APPENDIX

The following table lists the PMOS' assigned to each occupational field grouping.

Infantry	Non-Technical							Technical			
0311	0111	1161	2532	3112	5811	6094	6467	0612	5942	6217	6337
0313	0121	1171	2534	3361	5831	6112	6468	0613	5952	6222	6386
0321	0131	1181	2536	3381	5937	6113	6484	0614	5953	6227	6412
0331	0151	1316	2542	3432	5962	6114	6494	0621	5954	6252	6423
0341	0161	1341	2621	3451	5963	6116	6672	0623	5974	6256	6432
0351	0231	1345	2631	3521	6015	6122	6673	0627	5979	6257	6433
0352	0261	1361	2651	3531	6016	6123	6821	0651	6048	6282	6462
	0411	1371	2671	3533	6017	6124	6842	1141	6062	6286	6482
	0431	1391	2673	4066	6026	6132	7041	1142	6072	6287	6483
	0451	1812	2674	4067	6027	6152	7212	2141	6073	6312	6492
	0481	1833	2676	4341	6030	6153	7251	2146	6074	6314	6531
	0511	2111	2811	4421	6042	6232	7253	2147	6092	6316	6541
	0622	2131	2818	4612	6046	6276	7382	2171	6154	6317	6694
	0628	2161	2822	4615	6055	6311		2821	6156	6322	7011
	0656	2311	2844	4641	6056	6315		2831	6172	6323	7051
	0811	2512	2846	4671	6057	6335		2841	6173	6324	7234
	0842	2513	2881	5524	6060	6413		2847	6174	6326	7242
	0844	2514	3043	5541	6075	6414		2871	6176	6332	7257
	0847	2515	3051	5563	6085	6465		2887	6212	6333	7314
	0861	2531	3052	5711	6087	6466		5939	6216	6336	

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